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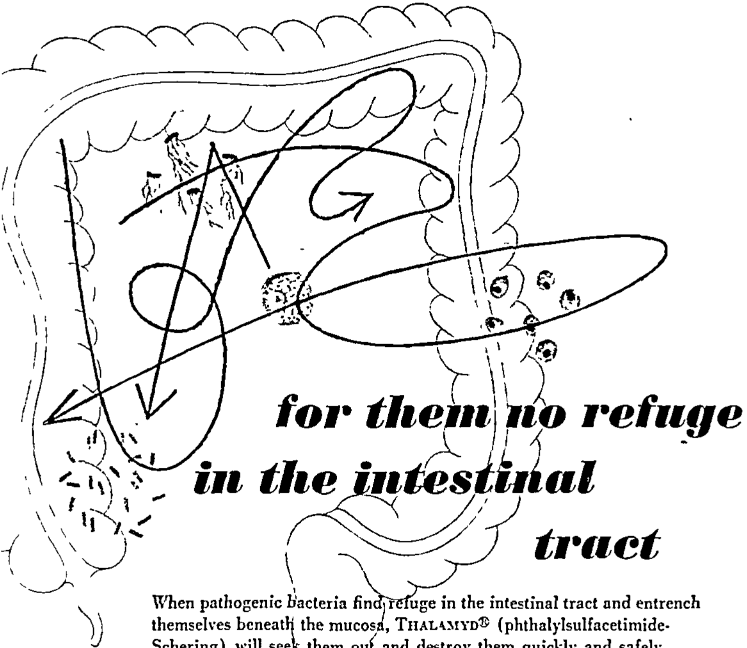

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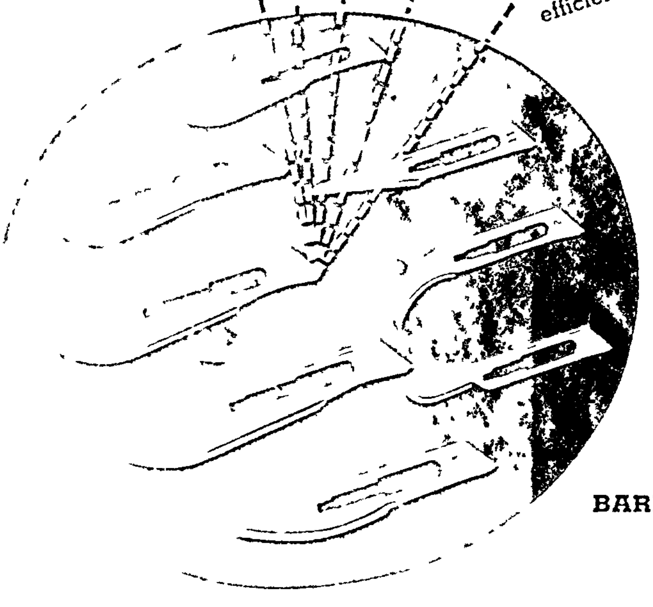

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Vol XIV DECEMBER, 1950 No 6

Original Articles

Restitution of Rectal Continence After Radical Operation for Carcinoma of the Colon and Rectum

HANS FINSTERER, M D, F I C S (Hon)
VIENNA

IN OUR country it has been observed that in spite of progress in diagnostic methods patients with carcinoma of the colon or the rectum come to operation very late and indeed often in a stage of acute obstruction One of the reasons lies with the patient himself He does not present himself for treatment because of his fear of a permanent colostomy, the disadvantages of which he may have observed in relatives or friends and because of the mistaken idea that any operative procedures to correct his symptoms would necessitate a permanent colostomy In a sense the patient has some justification for this belief he is unfamiliar with the numerous cases in which carcinomas of the colon and rectum have been cured after radical operation with normal rectal evacuation preserved Patients who have been operated on repeatedly do not usually know that a diagnosis of carcinoma has been made and hence do not refer to themselves as persons healed of carcinoma

Some physicians are also at fault in delaying diagnosis and operation for they believe that the permanent cure of carcinoma of the large bowel particularly the rectum with preservation of normal rectal function is exceptional The truth of the matter is that at least as far as carcinoma of the colon is concerned preservation of rectal continence is not infrequent

In cases of carcinoma of the colon a one stage resection with anastomosis is done and is followed by the immediate restitution of normal function This restitution is always possible with carcinoma of the right side of the colon unless acute obstruction is present and it is even possible with carcinoma of the left side if the bowel has been sufficiently decompressed In my experience one stage resection for left sided colonic carcinoma has had the lowest mortality (11 5 per cent) In the treatment of acute obstruction caused by carcinoma of the right side of the colon I have abandoned the one stage resection which has been reemphasized of late by Haberer and others *In its stead I make use of a two stage resection* In the first stage the terminal part of the ileum and the colon up to the hepatic flexure are

---

From the First Surgical Ward of the Vienna Allgemeines Krankenhaus Prof Dr H Finsterer Chief of Service

Read at the Fourteenth Annual Assembly of the United States Chapter International College of Surgeons Atlantic City November 1949

Submitted for publication Nov 25 1949

resected and are sewed into the abdominal wall, forming a double-barreled colostomy, the spur of which is subsequently crushed. In the second stage the colostomy is closed.

In cases of obstruction due to carcinoma of the left side of the colon I have found the two-stage resection unsatisfactory, because mobilization of the splenic flexure for a left hemicolectomy, which is necessary for a really radical operation, is not feasible in the presence of enormously distended loops of bowel. On the other hand, if there is a cancer in the distal part of a short sigmoid flexure, the distal part of the colon cannot be used for a doublebarreled colostomy. In my experience the operation of choice is a three-stage procedure: first cecostomy, then resection with immediate anastomosis after the colon has been decompressed, and finally closure of the cecostomy when the anastomosis has had sufficient time to heal. Primary resection is not feasible and indeed is dangerous if a carcinoma has perforated all layers of the bowel and has resulted in abscess formation. In these circumstances I do a bilateral bowel exclusion operation in which I interrupt the continuity of the intestine both proximal and distal to the affected area and, after performing an anastomosis between the transverse and the pelvic portions of the colon, suture the proximal and distal ends of the excluded bowel to the abdominal wall. At the same time the abscess is opened extraperitoneally and drained. After the infection has cleared the excluded segment of bowel containing the carcinoma is removed. Of the cases in which I employed this procedure, 2 are especially interesting.

A 46-year-old officer who had a fist-sized carcinoma of the hepatic flexure that had caused a perforation in the direction of the liver and resultant abscess formation underwent a bilateral bowel exclusion with ileocolostomy on April 11, 1918. The excluded bowel was removed four weeks later. The pathologist (Prof. Paltauf) reported an adenocarcinoma. The patient did well postoperatively and gained 90 pounds (40.8 Kg.). Nine and one-half years later a new carcinoma developed in the ileocolostomy, necessitating another operation. Because the carcinoma had invaded the stomach it was necessary to perform a gastrectomy as well as a colon resection. The postoperative course was uneventful, and healing was by first intention. Microscopic examination by Dr. Bauer revealed a tubular carcinoma of the colon with extension into the satellite lymph nodes. The patient died six months later of metastases to the liver.

A 53-year-old woman had a perforating carcinoma of the descending colon with a large abscess. On May 24, 1924, I did a bilateral exclusion operation with anastomosis between the transverse and sigmoid colon. Both ends of the excluded bowel were sutured to the abdominal wall, and the abscess was opened extraperitoneally. After six weeks the excluded segment of bowel was removed. The histologic diagnosis by Prof. Stoerk was tubular carcinoma which had invaded the entire thickness of the bowel. There was no evidence of metastasis to the regional lymph nodes. The postoperative course was uneventful; the patient gained 42 pounds (19.1 Kg.) in weight, and remained well during the next sixteen years, after which the symptoms of constipation and weight loss returned. Roentgen examination revealed a fist-sized carcinoma distal to the site of anastomosis. On Nov. 6, 1940, total extirpation of the colon was performed, with end-to-side anastomosis between the ileum and the rectum. The pathologist (Prof. Chiari) reported a microscopic diagnosis of mucoid carcinoma which had extended through the entire thickness of the bowel wall. The regional lymph nodes were not involved. The patient did well postoperatively. At first the patient had eight to ten stools a day. After a while she had two semisolid movements each day. She gained weight steadily. She was perfectly well for two years and then was lost sight of, because, being Jewish, she was placed in a concentration camp.

For carcinoma of the distal portion of the sigmoid, if the colon is too greatly distended or if there is a small abscess in the tissues adjacent to the carcinoma, a one-stage resection may be too dangerous. Likewise, the two-stage resection of Mikulicz may not be possible in the event that the distal segment of colon is too short. In these circumstances one is left with the alternative of performing a blind closure of the pelvic portion of the colon at the level of the cul de sac of Douglas and performing a colostomy in the proximal portion. Then, as a second operation, the splenic flexure and the descending and transverse portions of the colon can be mobilized, and in most patients the descending portion can be directly anastomosed with the blind end of the pelvic portion or the rectum. I prefer end-to-side anastomosis to the direct end-to-end union. By using this operative technic I have been able to restore rectal continence to many pa-

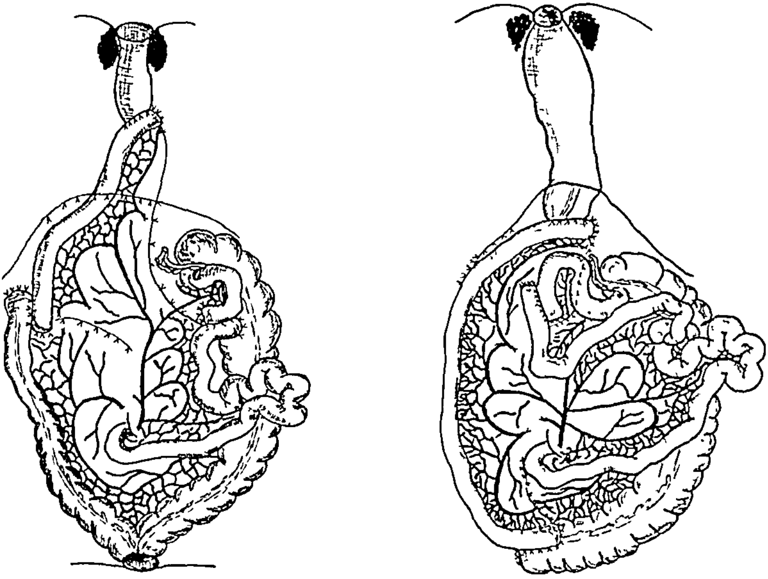

Fig. 1.—Interposition of small intestine between transverse and pelvic portions of colon (*left*) and between descending portion of colon and rectum (*right*).

tients. The following case is an unusual example:

A 54-year-old man had undergone a two-stage resection for carcinoma of the sigmoid (in Czechoslovakia). The proximal and distal ends of the intact bowel had been sutured into the abdominal wall 10 cm. apart. He presented himself in Vienna two years later with a fist-sized carcinoma which had originated in the distal segment and had extended into the abdominal wall. Although he had been declared inoperable elsewhere, I operated on him in a private hospital on May 2, 1923. The tumor, with a portion of the abdominal wall and a segment of pelvic colon 4 fingerbreadths in length, was resected. The cut end of the intact bowel was sutured into the lower end of the abdominal wound 20 cm. distal from the colostomy. The microscopic diagnosis (Prof. Stoerk) was annular carcinoma with transition to mucoid carcinoma originating in the bowel wall. The wound healed well. Two months later the splenic flexure and transverse colon were mobilized and a side-to-side anastomosis between the transverse and pelvic portions of the colon was performed. Healing was by first intention. The patient felt completely well and gained 42 pounds (19.1 Kg.) in weight. He came in for examination on numerous occasions and remained free from recurrence for at least thirteen years. He has not reported since Feb. 5, 1938. Being a Jew, he was confined to the Czechoslovak Protectorate.

In some cases, in which operation has resulted in a blind segment of pelvic colon and a colostomy, it is not possible to perform a direct anastomosis between the descending and the pelvic parts of the colon even after mobilization of the splenic flexure and ligation of the

Fig. 2.—Double-barreled colostomy (see text).

left colic artery. These are the rare cases in which an abnormally short transverse mesocolon is present. A direct anastomosis is not possible because it would result in too great a degree of tension. Even so, one can restore bowel continuity (and preserve rectal continence) by interposing a segment of small intestine. In this operation a segment of ileum 20 to 40 cm. long is isolated and interposed isoperistaltically between the transverse portion and the pelvic portion or the rectum. First. the continuity of the ileum is restored by a side-to-side anastomosis. Then the distal end of the excluded loop of ileum is anastomosed end to side with the pelvic colon or the rectum. Next the colostomy opening is closed; then the proximal end of the excluded loop is anastomosed side to side or side to end with the descending or the transverse portion of the colon (Fig. 1). An alternative is to form a double-barreled colostomy by suturing the transverse colon and the ileal loop to the abdominal wall. It is important to secure the free edges of the mesentery of the ileal loop to the peritoneum of the posterior abdominal wall. This is done to prevent pinching of the small intestine below the free mesentery.

In more than 450 radical operations for carcinoma of the colon it was necessary for me to perform this interposition of small bowel only five times to restore the continuity of the bowel. All 5 patients were cured. The first was operated on in 1918, during the first World War. in Garnisonspital No. 2 in Vienna. The case was reported in 1920 in a paper on total colon exclusion and appeared in *Deutsche Zeitschrift für Chirurgie*, volume 155, page 145.

The first case was that of a 50-year-old soldier on whom a colostomy was performed for intestinal obstruction caused by volvulus of the sigmoid. This was done in October 1917, in the military hospital in Linz. After two months the colostomy was closed, and shortly thereafter his pain recurred. In January 1918, two months later, in another military hospital an enterostomy was done because of intestinal obstruction of six days' duration, followed by a cecostomy because of a tumor at the junction of the sigmoid and the rectum. The patient was transferred to Garnisonspital No. 2 in Vienna to undergo radical operation. On February 15 operation was performed with local anesthesia of the abdominal wall, mesenteric anesthesia and inhalation anesthesia with 60 cc. of ether. First, a small bowel resection was done to eliminate the fistula. A stenosing carcinoma was found 15 cm. above the cul de sac of Douglas. It had begun to invade the mesocolon. The lymph nodes were involved along the inferior mesenteric artery almost to the origin of the left colic artery, with the result that this artery had to be ligated at a high level. Since the blood supply was intact only to the middle of the transverse colon, a bowel segment more than 1 M. in length had to be resected, the resection extending from the middle of the transverse colon to a point 1 handsbreadth distal to the tumor. The distal end was closed blindly, and a transversostomy was formed. The wound healed well. The histologic diagnosis (by Paltauf) was adenocarcinoma. Three weeks later an exploration was required because of obstruction. The terminal ileum had become adherent to the left laparotomy wound and was connected with the cecum under tension. All of the small intestine had herniated between the adherent ileum and the vertebral column, with resulting volvulus and obstruction. The adhesions were freed and the volvulus released. Healing was uneventful.

On May 2 an interposition of small intestine was done. A segment of ileum 20 cm. long was excluded and interposed between the transverse and pelvic portions of the colon. During operation several metastases in the distal colon were removed. Healing was by first intention. Recovery was uneventful. The patient was given extensive roentgen treatment. On June 7 the cecostomy was temporarily closed. On this occasion many metastases were observed in the peritoneum, the largest of which were bean sized. In addition, a large metastasis in the cecum made a suture line impossible. Under these circumstances the ileocecum was resected and an

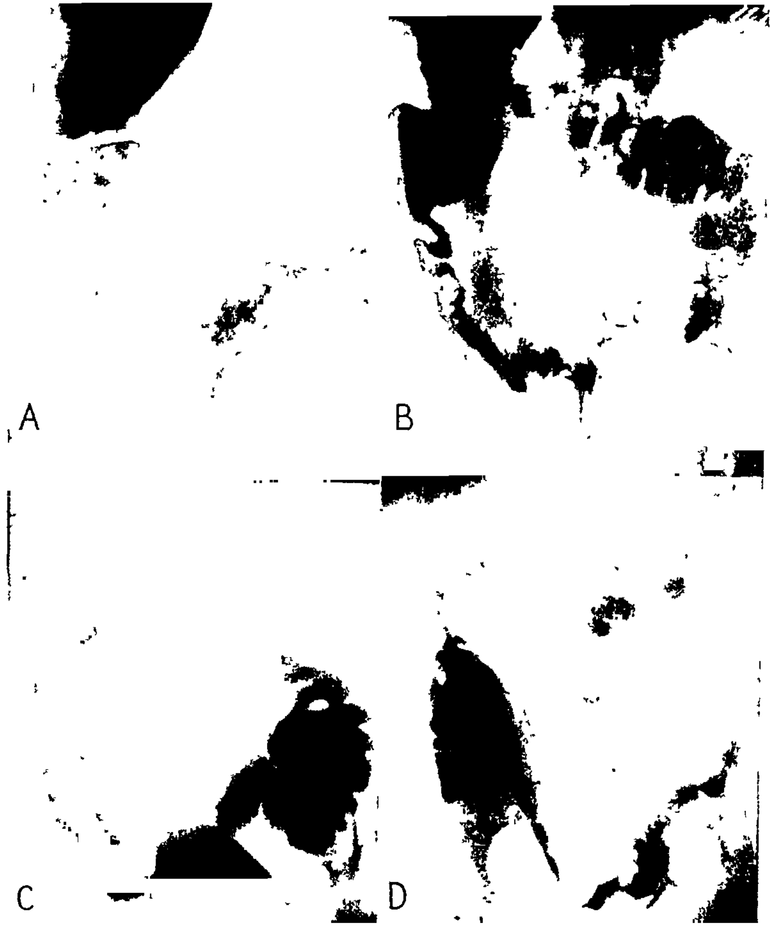

Fig 3.—Roentgenograms showing results of interposition operation for restitution of rectal continence after radical operation (see text for explanation)

end-to-end anastomosis was done. Postoperatively there developed infection of the abdominal wall. Because of the metastases, roentgen treatment was continued. The patient did well and gained 21 pounds (9.5 Kg.). He always had normal stools. In September, three months after the previous operation, the patient was admitted to Garnisonspital No. 2, but died (before operation could be done) on September 20. Autopsy showed carcinomatous metastases on the peritoneum and numerous ulcers on the transverse colon, one of which had perforated. The interposed ileal segment was hypertrophic and the side-to-end anastomosis to the distal colon was stenosed by a fibrous cicatrix.

The second case was that of a 55-year-old woman. One year previously she had been examined in a clinic and had been found to have a stenosing carcinoma of the sigmoid, but she refused operation. On Sept. 30, 1939, she presented herself for examination here and was found to have an obstruction associated with a 30-pound (13.6 Kg.) weight loss. A cecostomy was done, and at operation a large tumor of the sigmoid was found. On October 11 a left pararectal laparotomy was done (spinal anesthesia with percaine). The patient had a grapefruit-sized carcinoma of the sigmoid which had invaded the lateral abdominal wall, necessitating resection of a considerable area of the wall. The tumor had extended into the mesocolon; large lymph nodes were present along the inferior mesenteric artery, which necessitated a high ligation of this vessel. The transverse mesocolon was so short that even after mobilization of the splenic flexure the descending colon could not be brought down into the true pelvis. Therefore the pelvic colon was severed from the rectum; the rectal end was closed blindly and covered with peritoneum from the cul de sac of Douglas, and a colostomy was performed, with use of the descending colon distal to the splenic flexure. It was necessary to close off from the free peritoneal cavity the large peritoneal defect which had resulted from resection. This was done by suturing the left margin of the greater omentum to the peritoneum of the posterior abdominal wall. This large dead space, which now lay extraperitoneally, was drained with rubber and gauze drains, and the abdominal wall was closed. Microscopic examination of the resected tissue by Prof. Chiari revealed a highly differentiated adenocarcinoma. The lymph nodes were not involved. There was an uneventful recovery. On November 9 the cecostomy was closed extraperitoneally. The wound healed well.

The patient was readmitted to this service on Feb. 27, 1940, threatening suicide unless the colostomy were closed. After temporary closure of the colostomy, a left pararectal laparotomy was done (with spinal anesthesia and some additional ether anesthesia, for the spinal anesthesia was not completely effective.) Extensive adhesions bound the jejunum to the site of the previous operation. The jejunum was freed with considerable difficulty. A loop of ileum 40 cm. long was excluded 30 cm. from the cecum. The ileum was closed by a side-to-side anastomosis; then a side-to-end anastomosis between the distal end of the excluded loop and the rectum was done at the level of the pouch of Douglas. The mesentery of the excluded loop was carefully sutured to the posterior abdominal wall. The proximal colon was next mobilized and then, together with the proximal end of the ileal loop, was brought out in a double-barreled colostomy. The peritoneum of the anterior abdominal wall was dissected free and was sutured to the base of the colostomy, which thus lay completely extraperitoneally. A drain was placed in the pouch of Douglas, and the abdominal wall was sutured.

The postoperative course was uneventful. After a week the spur was crushed, and the patient was discharged from the hospital three weeks postoperatively. Two months later, on April 25, the patient returned for extraperitoneal closure of the colostomy. Healing took place without fistula formation. Since the continuity of the bowel was restored the patient has had normal stools and gained 20 pounds (9.1 Kg.) in weight. On June 14, two months after the last operative procedure, the patient, now completely well, was presented to the Surgical Society in Vienna (*Zentralblatt fur Chirurgie* 1941, page 511). The patient had a follow-up roentgen study on Oct. 4, 1949, which showed normal function of the interposed loop (Fig. 3*A*). Her bowels move regularly without laxatives. She has suffered from angina pectoris for one year.

The third case was that of a 61-year-old man, who had had difficult evacuation for one year because of a stenosing tumor of the sigmoid. On Feb. 24, 1939, operation was done with paravertebral and light nitrous oxide anesthesia. He had a fist-sized tumor in the middle of a short sigmoid, which was completely bound down to the true pelvis and which had invaded the bladder. After resection of the bladder and formation of a bladder suture line, it was possible to mobilize the densely adherent tumor. Because of a short transverse mesocolon, the colon could not be brought down to the pouch of Douglas even after ligation of the left colic artery, with the result that continence had to be sacrificed. When the sigmoid had been resected, the distal colon was closed blindly at the level of the cul de sac of Douglas. The proximal end of the colon was brought out below the left costal margin to form a colostomy. The peritoneal defect was closed by suturing the peritoneum of the lateral abdominal wall to the ligated mesocolon A drain was placed in the retroperitoneal space and another in the region of the splenic flexure The abdominal wound was closed The microscopic diagnosis (Prof Chiari) was adenocarcinoma involving all layers of the bowel wall The lymph nodes were free of metastases

The postoperative course was uneventful, and healing was by first intention The patient gained a considerable amount of weight One year later I suggested that he undergo an operation for the interposition of small intestine, but he refused During the Second World War the patient, who was a retired clerk, was reduced to such a state that he could no longer afford to buy the necessary soap dressings and linens He came to my surgical service in August 1943, almost four and one half years later, to have the suggested operation performed

The operation was done on Nov 9, 1943, with spinal anesthesia A midline laparotomy was done Loops of small bowel were adherent one to the other and in addition were adherent to the omentum and to the lateral abdominal wall These loops were freed with considerable difficulty, then a 40 cm segment of ileum 30 cm from the cecum was excluded The ileum was closed with a side to side anastomosis, and a side to end anastomosis was done between the distal end of the excluded ileal segment and the pelvic colon The mesentery of the excluded loop was sutured to the posterior abdominal wall The loop itself was fixed to the lateral abdominal wall *in the place of the descending colon* up to the level of the colostomy Healing took place by first intention Three weeks later, after a temporary closure of the colostomy, a left pararectal laparotomy was performed The excluded loop of ileum was looked for, which was difficult because of adhesions After mobilization of the descending colon, it was sutured to the ileal loop by means of an end to-side anastomosis A 20 cm segment of small bowel which had been completely stripped of serosa had to be partially excluded by means of an enteroanastomosis

The postoperative course was without complication, and healing was by first intention Since the operation the patient had gained 25 pounds (11 3 Kg) in weight and had had two spontaneous stools daily A follow up roentgenogram September 1944 showed normal function of the interposed ileal loop (Fig 3*B*) In April 1947, three and one half years after the last operative procedure the patient was hospitalized for two months because of a coronary infarct In 1949 he was in good shape as far as his gastrointestinal system was concerned His additional coronary heart disease still causes occasional discomfort

The fourth case was that of a 68 year old man who was admitted on Aug 31, 1944 to my surgical service because of intestinal obstruction of four days' duration Emergency operation revealed an enormously dilated cecum and an ascending colon filled with feces In addition there was an orange sized carcinoma in the sigmoid After an appendectomy had been done a cecostomy was performed with immediate drainage of the intestinal contents Postoperatively the patient had severe abscess formation around the cecostomy Three weeks later on September 19, a second operation was performed Paravertebral anesthesia was used because of low blood pressure (systolic pressure 100 mg of mercury) There was much fluid in the peritoneal cavity The sigmoid was diffusely injected and indurated and covered with fibrin The infection was spreading up to the left half of the transverse colon There was a fist sized carcinoma of the sigmoid which had invaded the bladder

Resection of the colon was done The bladder wall was resected, and the left ureter was dissected free The splenic flexure was mobilized An immediate anastomosis was not indicated because of infection of the bowel wall Therefore the pelvic portion of the colon was closed a handsbreadth above the pouch of Douglas and the transverse portion was brought out to form a colostomy One drain was placed in the true pelvis a second drain was placed under the left costal margin and the abdominal wound was closed Microscopic sections were diagnosed by Prof Chiari as papillary adeno*carcinoma The lymph nodes were not involved* Postoperatively, parotitis developed on the right side, a severe abscess involved a cecostomy and the transversostomy After subsidence of the infection the cecostomy was closed on October 31 Healing took place without fistula formation Recovery was slow and associated with an increase in weight

The patient underwent his fourth operation on Feb 28 1945 After temporary closure of the colostomy, a laparotomy was done The loops of small bowel had become adherent one to the other and these adhesions were freed with considerable difficulty Two small abscesses which had formed about ligatures were evacuated A considerable part of the transverse colon was bound down by adhesions and the mesocolon was shrunken Mobilization was not possible Therefore an interposition of small intestine was done, with a side-to end anastomosis between the distal end of the blindly closed ileal loop and the pelvic portion of the colon at the level of the cul de sac of Douglas The proximal end was brought out to the anterior abdominal wall with the transverse colon to form a double barreled colostomy A primary anastomosis was not possible because of infection of the wall of the colon After the spur had been crushed and the infection had disappeared, a fifth operation was done on March 20. The colostomy was closed; this was done with considerable difficulty because of marked scar formation. Postoperatively a fecal fistula developed, through which in the beginning almost all of the bowel contents were evacuated. The fistula gradually became smaller and drained only a small amount of feces. The patient gained 25 pounds (11.3 Kg.) and had normal stools. On Oct. 4, 1949, the patient returned for repeat roentgen studies. The fistula has been closed for more than one year, and the patient has no discomfort. The roentgen studies showed that the interposed loop of small bowel has dilated somewhat, but it can be easily recognized by means of its characteristic transverse folds (Fig. 3*C*).

The fifth case was that of a 56-year-old man who had had a carcinoma of the sigmoid for ten months. On Oct. 21, 1947, he underwent a left pararectal laparotomy under paravertebral anesthesia. There was present a fist-sized carcinoma in the middle of a very short sigmoid. The splenic flexure and transverse colon were mobilized. The bowel was resected 10 cm. distal and 25 cm. proximal to the carcinoma. Because the large bowel was not empty, primary anastomosis was contraindicated. Exteriorization was not possible, because the distal bowel was too short. Therefore the pelvic colon was closed blindly and the proximal bowel was brought out to form a colostomy. A drain was placed in the cul de sac of Douglas, and the wound was closed. The histologic diagnosis (Chiari) was ulcerative carcinoma, partly solid and partly adenomatous, which had invaded all layers of the colon wall and even the panniculus. The lymph nodes were not involved.

On December 10, two months later, a midline laparotomy was done with the region under spinal anesthesia. The loops of small bowel were markedly bound down. The colostomy was temporarily closed, and the transverse portion of the colon was mobilized. It was not possible to anastomose the bowel, because of a short mesocolon. Therefore an interposed loop of small bowel was anastomosed side to end with the pelvic portion of the colon. The transverse portion was cut proximal to the colostomy; both ends were closed blindly, and a side-to-side anastomosis was done with the proximal end of the interposed loop. The wound was drained and closed. The postoperative course was uneventful. On Jan. 5, 1948, one month later, the excluded colon was extirpated with the colostomy. At this time an abscess was seen on the lateral side. In addition, the whole small bowel had herniated under the anastomosis of colon and interposed loop and lay in the left upper abdominal quadrant. The herniated bowel segments were relieved and the mesocolon and transverse colon were sutured to the interposed loop. Gauze and rubber drains were placed, and the abdominal wound was closed. The patient did well postoperatively.

On Oct 3, 1949, two months later, the patient was asked to return for follow-up. He had gained 60 pounds (27.2 Kg.) in weight and was having normal stools. He had been free of pain until the last two months, but intermittent colicky pain was now present. Roentgen examination revealed partial intussusception of the interposed loop of small bowel (Fig. 3*D*).

Success with the interposition of small bowel is all the more important for the following reasons: In 3 cases I have obtained permanent cure of the carcinoma, and in the last case a permanent cure is to be expected, judging from the histologic report that the lymph nodes are free of carinoma. It is well known that, after radical operation, carcinoma of the colon yields a large per cent of cures. I reviewed my cases in 1930. Excluding those patients who could not be followed and those who had died of intercurrent disease, 68.7 per cent were free of recurrence after periods varying from five to nineteen years. (If all patients in the series are included, 53 per cent were cured.) Therefore, it seems that permanent colostomy should be avoided, in order that the cured patients may be made valuable members of society and that their personal lives may be made worth living.

Nordmann, at the German Surgical Congress in 1937, reported a case in which interposition of the small bowel was performed after resection of the large bowel had been done elsewhere for suspected carcinoma. In his review of the literature he noted that Nicoladoni in 1887 had already suggested this operation. It was first successfully performed on man in 1908, by Vignolo. In 1935 Quénu collected 7 cases of small bowel interposition in the literature. In 2 of these cases (those of Faltin and Michejda) resection had been done because of gangrene of the sigmoid. In the case of Reichel the sigmoid had to be resected because it had been injured during a uterine dilatation and curettage for hydatid mole. Reichel then formed a colostomy from the proximal colon. After four months he interposed a 35-cm. loop of small bowel between the blindly closed pelvic colon and the descending colon.

In addition to the 5 just reported I have done on 2 other occasions a small bowel interposition In the first of these it was necessary to perform gastrojejunal resection and also a two stage colon resection because of a large gastrocolic fistula In this case during the second operation a direct anastomosis of the colon was not possible Therefore a loop of jejunum was interposed between the two ends of the transverse colon In the second of these 2 cases this procedure was necessary because of extensive injury to the colon, incurred during an induced abortion

This was the case of a 27 year old woman who was admitted to my service on April 3 1947 with a uterine perforation associated with an intestinal injury and severe anemia At operation in addition to the uterine perforation there was a complete laceration of the sigmoid a tear in the descending colon in which the seromuscular layer had been separated from the mucosa a hematoma on the left side of the transverse colon and a tear in the capsule of the spleen The splenic wound was bleeding profusely The pelvic colon was closed blindly the rest of the descending colon was extirpated up to the transverse portion and this portion was brought out to form a colostomy The spleen was removed After these procedures the gynecologist who had been invited for consultation did a hysterectomy Blood was given during and after operation Postoperative recovery was slow

On September 11 five months later the patient was operated on with local anesthesia of the abdominal wall and ether anesthesia The adhesions were freed with difficulty A 40 cm ileal loop was excluded and sutured between the pelvic and transverse parts of the colon by means of a side to side anastomosis The postoperative course was uneventful and healing was by first intention In August 1948 eleven months later the patient who had been having normal evacuation daily was admitted because of obstruction due to adhesions However she was discharged after a short stay in which she was treated conservatively On Oct 3 1949 about two years after operation a roentgen follow up showed good function both of the bowel and of the interposed loop of ileum Although the patient has normal evacuation there is occasional pain under the left costal margin perhaps due to stagnation in the somewhat distended blindly closed transverse portion of the colon

In all cases in which it has been necessary to anastomose the distal end of the ileum with the pelvic portion of the colon I have used the end to side anastomosis because this method prevents as far as possible the occurrence of stenosis Nordmann invaginated the ileum into the pelvic portion of the colon and sutured the peritoneum of the cul de sac of Douglas to the ileal loop This method has the disadvantage of resulting in more frequent stenosis Also it is not without danger for thrombosis in the mesentery of the ileum may supervene and as a result the invaginated bowel may become gangrenous above the peritoneal suture line Quenu discussed Rudler's report of a case of ileocolic rectoplasty and warned against this invagination procedure because he had lost 1 patient to peritonitis In his case gangrene of the invaginated bowel occurred intraperitoneally above the peritoneal suture line and was followed by perforation and fatal peritonitis Union between the transverse portion of the colon and the proximal end of the excluded loop can be done directly by a side to side anastomosis or one can bring out the colon and ileum in a double barreled colostomy and later close the colostomy

The interposition of small intestine will always remain a rarely used operative procedure being indicated only in exceptional cases after resection of the left side of the colon In right sided colonic resection one can always join the bowel ends in an ileocolostomy When it is necessary to resect the transverse portion of the colon a direct anastomosis of the bowel ends is possible by mobilizing on the one hand the hepatic flexure and the ascending part of the colon and on the other hand the splenic flexure and the descending part During World War II in a six month period Richter of Linz found it necessary to resect the transverse colon in 3 young soldiers the first of whom had carcinoma the second chronic ulcerative colitis and the third traumatic laceration of the mesentery of the transverse portion of the colon Richter resected 22 to 28 cm of colon and repaired the defect by means of an excluded loop of jejunum In resections of the transverse portion of the colon for carcinoma and in more than 30 cases of gastrocolic resection for gastric carcinoma that had invaded the colon I have found it necessary to do a small bowel interposition I was always able to anastomose the bowel ends after mobilization of the hepatic and splenic flexures I be lieve that in the cases reported by Richter in which the operations were done in a SS military hospital, a direct anastomosis could have been done if the ends of the colon had been adequately mobilized.

Preservation of the rectal sphincter and of continence in the treatment of rectal carcinoma is possible only if the carcinoma is 6 cm. or more from the sphincter. Up to Jan. 1, 1948, I had preserved the sphincter in 425 of 603 radical operations for rectal carcinoma (70.4 per cent). In many countries—for example, in France, England and the United States—abdominoperineal extirpation has been done and is still done for carcinoma that lies 10 cm. or more above the sphincter. The explanation is given that only this operation is sufficiently radical and that preservation of the sphincter often results in recurrence. This assertion is not consistent with the experience of Hochenegg and his associates. Mandl found that, of 1,000 radical operations for rectal carcinoma in Hochenegg's clinic, 31 per cent resulted in a five-year cure after extirpation of the rectum and sphincter, while in 37 per cent the patients were cured when resection was done with preservation of the sphincter. In 1940 I reviewed my operative results for the years 1915 to 1935. In these cases 30 per cent of all patients discharged from the hospital after extirpation of the sphincter had remained free from recurrence after periods varying between five and twenty-two years, and 40.4 per cent of those who were operated on with preservation of the sphincter had no recurrence.

Some authors, in calculating their permanent cures, use a different statistical method. If patients may be excluded who die within a five-year postoperative period, of old age, cerebral vascular accident, or injury of unknown cause without evidence of recurrence, then the patients who have had permanent cures may be compared with those who have died of local recurrence or metastases. Using this method, I have had a cure rate of 54 per cent after resection and of 45 per cent after extirpation. Since carcinoma extends proximally, it is important that the satellite nymph nodes in the pelvic mesocolon be excised radically. This is accomplished more readily in an abdominosacral operation than in a purely sacral procedure. Therefore the largest percentage of permanent cures (46.1 per cent) has been obtained by abdominosacral resection. In reviewing the operative cases in my service from 1935 to Jan. 1, 1943, Dr. Haffner found in 1948 that 47.9 per cent of the resections and 40 per cent of the extirpations had resulted in permanent cure.

As for the technic employed in preservation of the sphincter, I consider the method of choice to be direct union of the sigmoid with the rectum in the sacral wound. This may be done either by an end-to-end anastomosis or, if the bowel loop is long enough, by a side-to-end anastomosis. The latter method has the advantage of preventing stenosis.

In cases of highly placed stenosing carcinoma a three-stage operation is done in order to prevent a blowout of the suture line and resultant infection of the sacral wound. First a transversostomy is done; then, after the bowel has been emptied, resection is performed. It is true that, despite the fact that transversostomy results in immobilization of the suture line, healing without fistula formation is very uncommon; however, most of the fistulas close spontaneously after a short time. Those that do not heal spontaneously can be closed by a plastic procedure. When the wound has been healed for three months the transversostomy is closed. After these operative procedures the patients are usually continent both of liquid feces and of flatus.

In 1940 I reviewed cases in which I had operated for rectal carcinoma up to 1935. Of 58 resections with end-to-end anastomosis 55, or 94.8 per cent, resulted in complete continence with normal stools. Three patients were only relatively continent. In 2 cases a small fistula had remained after plastic closure of a large sacral fistula. No solid stools were evacuated via the fistulas, but a small amount of liquid stool drained during episodes of diarrhea (which, however, bothered the patient only rarely). A 57-year-old patient had to take cathartics constantly because of high-grade stenosis of the suture line. When he had taken purgatives, he had not been able to retain liquid stools long enough, although he was completely continent of flatus. I suggested to this patient that the stenotic area be resected and that the new end-to-end anastomosis be treated immediately thereafter with a single

Permanent Cures Resulting from Radical Operations for Cancer of the Rectum (1915–193[illegible])

Operation	No. of cases	+ Post-operative	Unknown	+ Up to 5 years without recurrence	+ Local recurrence	+ Metastases	5–22 years without recurrence		
							Number	% of operative cases	% of cures
Sacral extirpation	21	7	5	1	3	2	3	14.2	21.4
Abdominosacral extirpation	19	3	2	2	2	4	6	13.5	37.5
Total	40	10	7	3	5	6	9	22.5	30.0
Sacral resection	48	6	7	6	2	13	14	29.1	33.3
Abdominosacral resection	66	14	4	7	3	14	24	36.3	46.1
Total	114	20	11	13	5	27	38	33.3	40.4

one third erythema dose of roentgen rays in order to prevent excessive scar formation and thus keep the anastomosis widely patent. I had had this experience in several cases. The patient, who lived in Czechoslovakia, would not consent to this simple procedure. He died thirteen years after the operation, at the age of 70, of a cerebral vascular accident. He had remained free from recurrence.

Stenosis can be prevented, even in patients who have a propensity toward overproduction of fibrous tissue, by means of a wide side to end anastomosis.

Fistula formation after resection can be prevented by the "Durchziehmethode" of Hochenegg. However, with this method I could achieve continence only for formed stool; the patients were incontinent of loose stools and gas. As a consequence I have abandoned the method.

Fistula formation can also be prevented by abdominal resection. This operation, however, is technically difficult because one must do the side to end anastomosis in the true pelvis 6 to 8 cm. above the sphincter. The results in this procedure are very satisfactory; the mortality is low (in my experience 2 deaths in 28 abdominal resections) and the patients after healing are completely continent.

The disadvantages of the three stage resection for rectal carcinoma, namely, the frequency of fistula formation, the necessity for further plastic procedures and the longer duration of treatment can be avoided by Bacon's method. This method, which Bacon himself demonstrated at the first meeting of the Austrian Chapter of the International College of Surgeons, is a considerable advance. His mortality of only 5 per cent is much less than that which results *after abdominosacral resection*. In my material in the last few years the results have been better, the mortality rate having dropped from 18.4 per cent to 15.2 per cent. If continence is as complete as after anastomosis of the colon with the rectum, the Bacon method will become the method of choice in selected cases.

In cases of abdominosacral resection with end to end anastomosis, if the sigmoid becomes largely gangrenous as a result of an inadequate blood supply, e.g., thrombosis in the mesosigmoid, then a direct anastomosis of the colon to the ampulla of the rectum is possible only when the proximal portion of the sigmoid is relatively long and the descending portion and splenic flexure can be mobilized. When the sigmoid is short one must sacrifice normal bowel function. The sigmoid must be cut above the level of the pouch of Douglas; the distal portion of the sigmoid must be extirpated, the peritoneum of the pouch of Douglas closed and the proximal colon brought out to form a permanent colostomy and in the iliac area. This is more advantageous for the patient than a transversostomy, for in the latter procedure, after closure of the transversostomy, the fecal material would remain in the left transverse portion of the colon proximal to the splenic flexure for a longer time and would become harder. Furthermore, transversostomy is an operation which is used only in preparation for resection. It is not intended to be permanent, because, particularly if the colostomy dressing does not fit well, the posterior colon wall tends to fold back upon itself and to produce a large hammer prolapse. In this fold of colon a large segment of small intestine may herniate and become irreducible and incarcerated.

For example, a 73-year-old man underwent transversostomy on Jan. 2, 1932, because of a highly placed rectal carcinoma. Ten days later I performed an abdominosacral resection with an end-to-end anastomosis. The histological diagnosis by Prof. Sternberg was adenocarcinoma without involvement of the lymph nodes. The wound healed with formation of a small fistula, which closed in a short time. However, the patient would not allow closure of the transversostomy. Nine years later, on Dec. 2, 1941, he was admitted to this service with a hammer prolapse which he was not able to reduce. With the patient in the recumbent position I was easily able to reduce the hammer prolapse, which extended almost to the symphysis. Because of the danger of a laceration of the colon wall, the transversostomy was closed in the usual way. After this the patient had complete continence and normal stools.

If a patient in whom a direct anastomosis of the mobilized descending colon with the rectum is not possible asks for the restitution of continence, the only procedure possible is an interposition of small bowel between the descending colon and the ampulla of the rectum. This operation, which can be done only by the abdominosacral route, is an extremely difficult procedure. I have performed it on only 4 occasions.

The method is as follows: With the region under spinal anesthesia a lower midline incision is made and a 30-40 cm. ileal loop is completely excluded; the ends are closed blindly, and the continuity of the ileum is restored by a side-to-side anastomosis. Then the sigmoid is cut above the cul de sac of Douglas. After incision of the peritoneum of the pouch of Douglas the distal bowel is closed blindly and pushed down into the true pelvis. The proximal end of the excluded loop is joined to the descending colon by means of either a side-to-side or an end-to-side anastomosis. The mesentery of the excluded loop is sutured to the posterior abdominal wall. The distal end of the excluded loop is pushed down into the hollow of the sacrum. The peritoneum of the pouch of Douglas is sutured to the mesentery and to the ileal loop without its interfering with the blood vessels in the mesenterial arcades. The abdominal cavity is then closed. With the patient lying on his left side, a sacral incision is made. After excision of scar tissue, the remaining part of the colon which lies beneath the peritoneum is removed. The ampulla of the rectum, which has become closed by scar tissue, is opened. The distal end of the ileal loop is pulled out of the pelvis and is joined to the ampulla of the rectum by means of a side-to-end anastomosis. Sulfonamide powder is sprinkled in the base of the wound, a drain is inserted and the sacral wound is closed. The transversostomy remains open until the sacral wound is completely healed. Of 4 patients so operated on, 1 died.

The patient who died was a 67-year-old man who had had an annular carcinoma for one year, 10 cm. above the sphincter. On June 26, 1942, a temporary transversostomy was done. The liver was free of metastases. An annular carcinoma was present above the level of the cul de sac of Douglas. It was noted that there was a short pelvic mesocolon. The postoperative course was uneventful. The patient was discharged to his home after four weeks during my absence and readmitted for radical operation upon my return. On September 3, two months after the transversostomy, an abdominosacral resection was done with spinal anesthesia. There was a carcinoma at the level of the pouch of Douglas which had invaded the bladder. The lymph nodes in the mesosigmoid were enlarged. The sigmoid was very short and was therefore mobilized with great difficulty. Complete suture of the pouch of Douglas was possible from above The abdominal wound was then closed Then, with the patient lying on his side the Kraske procedure was done The last sacral vertebra was removed There was a large tumor which was fixed to the left side of the periosteum of the anterior surface of the sacrum This tumor was mobilized with great difficulty and delivered through the wound The rectum was cut 3 fingerbreadths distal and the colon 15 cm proximal to the carcinoma An end to end anastomosis was done The proximal portion of the bowel was under some tension and appeared to have an inadequate blood supply Two gauze drains and a rubber drain were placed in the wound which was then closed The microscopic sections, according to the report of Prof Chiari, showed that all layers of the bowel wall were invaded by an adenocarcinoma which had extended even into the periproctal fatty tissues Postoperatively there developed considerable gangrene of the proximal bowel The sacral wound healed slowly by granulation In March 1943 seven months after operation the patient was readmitted to the surgical service and asked for closure of the transversostomy, which however, was not possible at that time On March 8 the sacral scar and the fistula were excised The proximal portion of the lumen could not be located The rectal stump was 5 cm long with no evidence of metastases

In June the patient who had recovered satisfactorily, was again admitted to the hospital He asked that the colostomy be closed at all costs therefore a small bowel interposition was undertaken on June 13, with spinal anesthesia A lower midline incision was made Since the sigmoid flexure was very short it was impossible to anastomose it directly with the rectum A 30 cm ileal loop was excluded The sigmoid was cut at its junction with the descending colon Both ends were blindly closed The descending colon was joined to the proximal end of the excluded loop in a side to side anastomosis The distal end of the ileal loop after excision of scar tissue was pushed down into the hollow of the sacrum The peritoneum of the pouch of Douglas was sutured over the excluded loop and the abdominal wound was closed With the patient lying on his left side the scar tissue was removed and the end of the rectum was dissected free Then the end of the sigmoid was removed The lower end of the excluded loop was next pulled out of the hollow of the sacrum and joined to the rectal stump by means of a side to end anastomosis Sulfonamide powder was sprinkled in the base of the wound, a drain was placed in position and the wound was closed The patient died six days after the operation Autopsy revealed fibrinopurulent peritonitis due to insufficiency of the suture line of the anastomosis between the descending colon and the interposed loop

Considering the poor condition of this patient (he was 5 feet 7 inches [170 18 cm] tall and weighed 101 pounds [45 8 Kg]) it would have been safer to bring out the ileum and the descending portion of the colon in a double barreled colostomy instead of using the direct anastomosis If this had been done perhaps failure could have been avoided The other 3 patients were cured After closure of the transversostomy, there was normal stool evacuation Unfortunately I have not been able to follow 2 of the patients who live outside of Austria According to the family physician the third patient committed suicide because of family difficulties three months after closure of the transversostomy Bowel function had been completely normal

The fact that an interposition of small bowel can be successfully carried out after resection of the rectum and a considerable part of the large bowel has been borne out by the experience of Denk in 2 cases The procedure was not done for carcinoma but rather (in the first case) for extensive polyposis involving the whole large intestine and (in the second case) for severe ulcerative colitis In both cases by means of multiple stage operations an ileal loop was interposed between the intact cecum and the ascending portion of the colon proximally and the rectum distally Normal bowel function resulted In a personal communication Denk informed me that he was able to follow the first patient for only a few years During this period the patient had had no discomfort and evacuation had been normal The second patient had had the ileal loop anastomosed to an artificial terminal bowel because of a diseased rectum This patient who was followed for many years has had completely normal bowel function and no discomfort

When a carcinoma lies near the sphincter or directly invades it a sufficiently radical procedure involves removal of the sphincter My teacher, Hochenegg has always created a sacral colostomy in these cases However for thirty years I have consistently used an abdominal colostomy in this situation because the patient can more readily maintain per sonal hygiene. Early in my operative work I formed a double-barreled iliac colostomy in almost all cases. This procedure was followed by a second operation in which the rectum and sphincter were removed; the pelvic portion of the colon was closed by folding in the end with a purse-string suture and then closing the peritoneum of the pouch of Douglas over it. With this procedure, distal to the double-barreled colostomy the bowel ended in a blind sac which had to be rinsed regularly in order to prevent impaction. This method, which Schmieden called "ninteres Einstülpungsverfahren," I reserve for old and cachectic patients who are unable to tolerate the extensive surgical maneuvers associated with an abdominosacral extirpation and an abdominal colostomy.

In order to produce relative continence after abdominosacral extirpation I have been using for the past twenty years a method which I call abdominosacral extirpation with subcutaneous colostomy. In this procedure a midline incision is made; the sigmoid is cut in its middle portion; the distal loop is closed blindly, and, after the cul de sac of Douglas has been opened, the loop is pushed down into the hollow of the sacrum. Then the peritoneum of the cul de sac of Douglas is closed over it. The proximal bowel, which was temporarily closed by a purse-string suture, is pulled out through a small pararectal incision at the level of the anterior superior spine. It is brought to the midline through a subcutaneous canal and sewed at this point to the skin. If the patient wears a support with an aluminum basin to collect the stools and if he tightens this belt for a short time, he can compress the bowel which lies between the skin and the rectal sheath and thus retain even gas for a certain period, perhaps long enough for a visit to the theater or the motion pictures. A few patients have made the statement that they can feel when the stool enters the subcutaneous portion of the colon through the peritoneal ring. I have had several female patients who learned to regulate their bowel function so that they had a bowel movement only every other day. These patients give themselves an enema of warm water at a temperature of 104 F., after which they have several movements within one-half to one hour. The bowel then remains empty for forty-eight hours, and some do not wear the belt during this period. If they do wear it and make it tight, they are also continent for flatus. The patients are greatly pleased with this method.

In order to achieve partial continence, Kurtzahn and Haecker of Payr's Clinic have published a method of their own. Proximal to the iliac colostomy a tube of skin is pulled through under the previously exteriorized transverse colon. The bowel could thus be temporarily closed off by putting a rubber stopper in the skin tube. The results were excellent. Of 14 patients, 4 remained completely free from discomfort for six to eight years. I carried out this procedure twenty-five years ago on a 40-year-old woman. She was completely cured, but was able to use the skin tube for only a short time because of eczema. Because of the possibility of chronic eczema, I have not used the method since. I prefer in these cases the subcutaneous abdominal colostomy, which recults in considerable satisfaction to the patient, although it is not a completely adequate substitute for a sphincter.

Witzel in 1903 made the suggestion that the sphincter should be removed in every case of rectal carcinoma, no matter how highly situated. Kraske in 1905 wrote, in reply to the statement of Witzel, as follows: "If a man operates to extirpate a rectal carcinoma which in doing so removes a normal and easily preserved sphincter which is such an important part of the organism, I must say that such a man does the patient a grave injustice and sins against the first commandment of operative surgery." It is my conviction that these words of Kraske, written forty-four years ago, are still entirely applicable. Since the sphincter can not be replaced after it has once been removed, may these words be an exhortation to all surgeons to preserve the sphincter in all cases in which it is possible.

SUMMARY

In carcinoma of the colon it is nearly always possible to restore normal evacuation; therefore a permanent colostomy should be avoided. If it is impossible after resection of the descending colon to anastomose the bowel ends, an excluded loop of ileum can be interposed between the proximal portion of the

colon and the rectum This operation is rarely done In my experience of more than 450 radical resections for carcinoma of the colon it was indicated in only 5 cases All 5 of the patients were cured Three of the cures can be considered permanent that of a 65 year old woman operated on ten years ago, that of a 71-year old man operated on ten and one-half years ago and that of a 73-year old man operated on five years ago These patients are still living and well and have normal spontaneous stools In addition, the interposition of small intestine was used to restore the continuity of the bowel in 2 other cases, 1 in which gastrojejunal resection and two stage colonic resection were done because of a gastrocolic fistula and another in which these operations were performed because of a laceration of the sigmoid and descending colon associated with splenic rupture resulting from instrumental abortion Both patients have remained well

In cases of rectal carcinoma it has been possible for me to preserve the sphincter in 70.4 per cent of 603 radical operations The permanent results of operation with preservation of the sphincter were better than those following extirpation of the sphincter Thirty three and one third per cent of patients who underwent sacral resection and 46.4 per cent of those who underwent abdominosacral resection remained free from recurrence after five to twenty two years, the rate of cure after five years for sacral extirpation was 21.4 per cent and for abdominosacral extirpation 37.5 per cent Of patients in whom the sphincter had been preserved, 94.8 per cent were continent even for loose stools and flatus after closure of the transversostomy Fistula formation after resection can be avoided either by abdominal resection (the anastomosis being performed in the true pelvis) or by the method introduced by Bacon

In the presence of marked involvement of the proximal portion of the colon and an insufficiently long sigmoid, an ileal loop can be interposed between the descending colon and the rectal stump to restore continuity This operation was done by me in 4 cases, with 1 death resulting from insufficiency of the suture line

In cases of carcinoma near the sphincter, a subcutaneous abdominal colostomy can be done, in which that part of the bowel which lies between the skin and the rectus sheath can be compressed by a belt so that the patient can retain temporarily the bowel contents and even flatus Because there is no completely adequate substitute for the sphincter, the surgeon will do well to preserve the sphincter if at all possible

RÉSUMÉ

Dans les cas de carcinome du côlon, il est toujours possible de rétablir l'évacuation normale, ainsi une côlostomie permanente devrait etre évitée, S'il est impossible après resection du côlon descendant d'anastomoser les boutes intestinaux, une anse de l'ileum peut être interposée entre la portion proximale du colon et du rectum Cette opération est rarement faite Dans mon experience de plus de 450 résections radicales pour carcinome du côlon elle fut indiquée dan 5 cas seulament Les 5 cas furent gueris 3 de ces guerisons peuvent être considérées permanentes Il y eut une femme operée, il y a dix ans elle etait agée de 65 ans, un homme de 71 ans opéré, il y a 5 ans Ces malades vivent sont bien portants et ont des selles normales et spontanées En plus l'interposition de l'intestin grêle fut employée pour etablir la continuité de l'intestin dans deux autres cas, un dans lequel une résection gastrojéjunale et une résection colonique en deux stades furent faites en vue d'une fistule gastrologique et d'un autre dans laquelle ces operations furent faites parce qu'il y avait une lacération du sigmoide et du côlon descendant associée à une rupture de la rate due a un avortement instrumental Les deux malades sont retablis et sont toujours bien

Dans les cas de carcinome du rectum, il a ete possible pour moi de préserver le sphincter dans 70.4% de 603 operations radicales Les résultats permanents de l'opération avec préservation du sphincter sont meilleurs que ceux dans lesquels il y eut extirpation du sphincter 33 et ⅓ des malades qui subissent une resection sacrale et 46.4% de ceux qui subissent une resection abdominosacrale ne montrerent aucune récidive pendant 5 a 22 ans

La guérison apres 5 ans d'extirpation sacral fut 21,4% et pour extirpation abdominosacrale 37.5% Des malades dans lesquels on conserva

le sphincter 94,8% purent contenir leurs selles et leu gaz après la fermeture de la transversostomie. La formation de la fistule après resection peut être évitée ou par une résection abdominale (l'anastomose faite dans le vrai pelvis) ou par la methode introduite par Bacon.

En présence d'une nécrose considerable du côlon et d'un sigmoide insuffisament longue, une anse iléale peut être interposée entre le colon descendant et le moignon rectal afin de restaurer la continuite. J'ai fait cette opération dans 4 cas. Il y eut un décès résultant d'insuffisance de la ligne de suture. Dans les cas de carcinome près du sphincter une côlostomie abdominale sous cutanée peut être faite dans laquelle cette partie dans l'intestin placée entre la peau et la gaine du rectus peut être comprimée par une ceinture qui permet au malade de retenir temporairement le contenu intestinal et même les gaz. Vu qu'il n'y a aucune substitution complètement adéquate pour le sphincter, le chirurgien doit préserver le sphincter et ne pas le sacrifier quand c'est possible. C'est pour les meilleurs intérêts du malade.

ZUSAMMENFASSUNG

In Faellen von Dickdarmkrebs ist die Herstellung normaler Stuhlgangsverhaeltnisse immer moeglich, und eine dauernde Dickdarmfistel sollte deshalb vermieden werden. Wenn nach einer Resektion des absteigenden Dickdarms die Vereinigung der Darmstuempfe unmoeglich ist, kann eine isolierte Ileumschlinge zwischen das proximale Kolonende und das Rektum eingefuegt werden. Diese Operation wird selten ausgefuehrt. An meinem Material von ueber vierhundertfuenfzig Radikalresektionen wegen Dickdarmkrebses war sie in nur fuenf Faellen angezeigt. Alle diese fuenf Kranken wurden geheilt. Drei davon koennen als Dauerheilungen angesehen werden, naemlich die einer vor zehn Jahren operierten fuenfundsechzigjaehrigen Frau, die eines vor zehneinhalf Jahren operierten einundsiebzigjaehrigen und die eines vor fuenf Jahren operierten dreiundsiebzigjaehrigen Mannes. Diese Kranken leben noch, fuehlen sich wohl und haben normalen spontanen Stuhl. Darueber hinaus wurde die Einpflanzung einer Duenndarmschlinge zur Wiederherstellung der Kontinuitaet des Darmes in zwei weiteren Faellen angewandt. In einem dieser Faelle war wegen einer gastrokolischen Fistel eine gastrojejunale Resektion und eine zweizeitige Dickdarmresektion vorgenommen worden. In dem anderen Falle wurden diese Operationen wegen Verletzungen des Sigmoids und des absteigenden Dickdarms mit einhergehender Zerreissung der Milz als Folge eines instrumentellen Aborts vorgenommen. Beiden Patienten geht es gut.

In Faellen von Mastdarmkrebs ist es mir moeglich gewesen, an einem Material von sechshundertdrei Radikaloperationen den Schliessmuskel in 70.5% zu erhalten. Die Dauerresultate der Operationen mit Erhaltung des Schliessmuskels waren besser als die in den Faellen, wo der Sphinkter enfernt wurde. 33.3% der Kranken, an denen das Kreuzbein reseziert wurde und 64.4% derer, an denen eine abdominosakrale Resektion vorgenommen wurde, blieben fuer die Dauer von fuenf bis zweiundzwanzig Jahren frei von Rueckfaellen; die Heilungsziffer nach fuenf Jahren betrug 21.4% fuer die Kreuzbeinresektionen und 37.5% fuer die abdominosakralen Extirpationen. Von den Kranken, denen der Schliessmuskel erhalten wurde, zeigten 94.8% eine voellige Kontrolle sogar ueber lockere Stuehle und Blaehungen nach Schliessung der Transversumfistel. Fistelbildungen nach Resektionen koennen vermieden werden entweder durch abdominelle Resektion (wobei die Anastomose im kleinen Becken ausgefuehrt wird) oder durch das von Bacon eingefuehrte Verfahren. In Faellen, wo eine erhebliche Nekrose des proximalen Dickdarmendes besteht und die Sigmaschlinge nicht lang genug ist, kann eine Ileumschlinge zwischen das absteigende Kolon und den Mastdarmstumpf eingefuehrt werden, um die Kontinuitaet wiederherzustellen. Diese Operation ist in vier von meinen Faellen ausgefuehrt worden, von denen einer infolge einer Insuffizienz der Naehte starb.

In Faellen von sphinkternahen Krebsen kann eine subkutane abdominelle Kolonfistel angelegt werden, wobei der Teil des Darmes, der zwischen der Haut und der Rektusscheide liegt, durch einen Guertel komprimiert werden kann, sodass der Patient in der Lage ist, den Darminhalt und sogar Gase zeitweilig zurueck-

zuhalten. Da es keinen voellig zulaenglichen Ersatz fuer den Schliessmuskel gibt, wird der Chirurg zum Besten seines Kranken versuchen, den Sphinkter wenn nur irgend moeglich zu erhalten.

RIASSUNTO

Nei carcinomi del colon e' sempre possibile ripristinare una normale defecazione. Una colostomia permanente va quindi evitata. Se dopo una resezione del colon discendente i capi intestinali non possono essere anastomizzati si puo' escludere ed interporre un'ansa intestinale tra la porzione prossimale del colon ed il retto. Questa e' pero un'operazione raramente eseguita. L'A. ha fatto ricorso ad un'operazione del genere solamente in 5 casi sopra 450 resezioni radicali per carcinomi del colon: tutti quanti sono guariti. In 3 casi la guarigione puo' essere ritenuta definitiva. Nel primo caso si tratta di una donna di 65 anni operata 10 anni or sono, nel secondo di un uomo di 71 anno operato da oltre 10 anni, nel terzo riguardante un uomo di 73 anni, la guarigione data da 5 anni. Questi 3 pazienti sono tuttora vivi ed in buone condizioni di salute: la defecazione e' spontanea e normale.

L'interposizione di un'ansa del tenue per ripristinare la continuita' dell'intestino e' stata eseguita in altri 2 casi. Nel primo a complemento di una resezione gastro-digiunale ed una resezione in due tempi del colon per fistola gastro-colica, nel secondo per una lacerazione del sigma e del colon discendente con rottura della milza da aborto strumentale. Anche questi due casi sono guariti.

L'A. ha potuto conservare lo sfintere nel 70.4% delle operazioni radicali per cancro del retto: queste ascendono a 603. I risultati definitivi sono riusciti migliori conservando lo sfintere. Nel 33.3% dei pazienti sottoposti ad una resezione sacrale e nel 46.4% di quelli sottoposti ad una resezione addomino-sacrale la guarigione data da 5 a 22 anni. Dopo 5 anni la percentuale di guarigione e' stata del 21.4% per le resezioni sacrali, del 37.5% per le resezioni addominosacrali.

Una continenza anche per i gas e per le feci liquide e' stata ottenuta nel 94.8% dei pazienti nei quali era stato conservato lo sfintere dopo chiusura della transversostomia. La formazione di fistole dopo la resezione puo' essere evitata sia mediante una resezione addominale (l'anastomosi viene eseguita nella cavita' pelvica) oppure mediante il metodo proposto da Bacon.

Allorquando esiste una notevole necrosi della porzione prossimale del colon ed un sigma non sufficientemente lungo, un'ansa dell'ileo puo' essere interposta fra il colon discendente ed il moncone rettale. L'A. ha eseguito quest'operazione in 4 casi: un caso e' morto in seguito ad una deiscenza della linea di sutura.

Nei carcinomi prossimi allo sfintere si puo' eseguire una colostomia addominale sottocutanea in modo che la porzione dell'intestino situata fra la cute e la fascia del retto puo' essere compressa da una cintura. I pazienti possono cosi trattenere temporaneamente il contenuto intestinale e perfino i gas.

Dato che non esiste ancora una sostituzione perfetta dello sfintere e' bene che il chirurgo tenti ogni mezzo per rispettarlo e per conservarlo nell'interesse del paziente.

RESUMEN

En casos de carcinoma del colon es siempre posible restaurar la evacuacion normal, debiéndose evitar en consecuencia la colostomía permanente. No es posible la anastomosis de los cabos intestinales después de reseccion del colon descendente, pudiéndose interponer un asa excluida del ileon entre la porción proximal del colon y el recto. Esta operacion se hace raramente. En mas de 450 resecciones radicales por carcinoma del colon solamente estuvo indicada en 5 casos. Estos 5 pacientes curaron todos. Pueden considerarse permanentes 3 de estas curaciones: una mujer de 65 años de edad operada hace 10 años, un hombre de 71 años de edad operado hace 10 años y un hombre de 73 años de edad operado hace 5 años. Estos pacientes viven todavia, estan bien y tienen evacuaciones del vientre espontaneas y normales. Ademas, se uso la interposicion del intestino delgado para restaurar la continuidad intestinal en 2 casos: uno en que se hizo reseccion gastroyeyunal y reseccion colica en dos tiempos por fistula gastrocolica, otro en que se efectuaron dichas operaciones por laceracion del sigmoides y colon descendente asociado con ruptura esplénica por aborto instrumental. Ambos pacientes permanecen bien.

En casos de carcinoma recal ha sido posible al autor preservar el esfínter en el 70.4% de 603 operaciones radicales. Los resultados permanentes de la operación con preservación del esfínter fueron mejores que los consecutivos a la extirpación del mismo. El 33.3% de los pacientes en quienes se efectuó resección sacral y el 46.4% de aquellos en quienes se efectuó resección abdóminosacral permanecieron libres de recidiva después de 5 a 42 años, con índices de curación después de 5 años de 21.4% para la extirpación sacral y de 37.5% para la extirpación abdóminosacral. En pacientes en quienes el esfínter fué preservado, 94.8% mostraron continencia aun para evacuaciones flojas y ventosidades del vientre después del cierre de la transversostomía. Puede evitarse la fistulización postresección por la resección abdominal (anastomosis en la pelvis verda dera) o por el método de Bacon.

En presencia de necrosis considerable de la porción proximal del colon y sigmoides insuficientemente. larga, puede interponerse un asa ileal entre el colon descendente y el muñón rectal para restaurar la continuidad. El autor efectuó esta operación en 4 casos, con 1 muerte por insuficiencia de la sutura.

En casos de carcinoma cercano al esfínter puede hacerse colostomía abdominal subcutánea, en la que la parte intestinal comprendida entre la piel y la vaina del recto puede comprimirse con un cinturón, de modo que el paciente pueda retener temporalmente el contenido intestinal y aun ventosidades. En virtud de que la substitución del esfínter no es completamente adecuada, el cirujano hará bien en preservar todo lo posible el esfínter, para el mayor beneficio del paciente.

Author's Note: I wish to thank Dr. Max Chiari of Vienna for translating this paper. I should like also to thank Lt. Joseph C. Cullina, U.S.A.F. (M.C.), for his great kindness in helping Dr. Chiari translate the paper into idiomatic English.

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Life is the art of drawing sufficient conclusions from insufficient premises.

Every new idea has something of the pain and peril of childbirth about it; ideas are just as mortal and just as immortal as organized beings are.

We are all agreed that too much faith is as bad as too little, and too little as bad as too much; but we differ as to what is too much and too little.

To himself everyone is an immortal; he may know that he is going to die, but he never knows that he is dead.—*Samuel Butler*

Recent Developments in the Diagnosis of Thyrotoxicosis

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THE CHIEF emphasis of this presentation is on clinical diagnosis. It has long been clear that the diagnosis of thyrotoxicosis is largely dependent on cardiac symptoms, which to a certain extent dominate the syndrome.

In 1923, the year in which Plummer of the Mayo clinic published his investigations on preoperative iodine treatment, surgeons obtained, *in addition to an epoch making supplement*, and a unique improvement of the prognosis, an important aid in differential diagnosis—knowledge of the fact that thyrotoxicosis is improved by intensive iodinization.

Although the central importance of cardiac symptoms in this syndrome was established in the earliest descriptions (Parry, Graves, Basedow), the clinicians of our day were far more in the dark as regards another question: Which of the cardiac symptoms deserves most attention? Consequently there was ample room for the new investigations I have carried out at Professor Warburg's Medical University Clinic in Copenhagen.

The peculiar circulatory dynamics are most lucidly demonstrated by preoperative and postoperative examinations of the blood pressure. In order to give an impression of the blood pressure amplitude I shall mention that the average values for blood pressure, in millimeters of mercury, according to the Mayo Clinic material published by Pemberton and Willius are 147 systolic and 73 diastolic, material published by the Danish physician Jacobsen records values of 143 systolic and 73 diastolic. In a study of my own the average values were 139 systolic and 66 diastolic before operation and 126 systolic and 74 diastolic on postoperative reexamination, thus showing a fall in the systolic and an increase in the diastolic blood pressure.

Figure 1 demonstrates that prior to the operation the systolic blood pressure in about one half of the cases was higher than the normal maximum for persons in the respective age groups (the full line). On reexamination after the operation the systolic blood pressure had usually decreased somewhat, and the excessively high values had fallen to a normal level. It will further be seen that the diastolic blood pressure had increased. The relation between the systolic and the diastolic pressure is plotted in a separate diagram so that the full *line represents the values with an amplitude* of 50 per cent, that is, the cases in which the diastolic blood pressure amounted to one half the systolic. Thus the excessive preoperative amplitude is found to have been reduced considerably, as a majority of the patients who before the operation showed an amplitude of 40 to 70 per cent showed postoperative values of 30 to 50 per cent.

The increased standard metabolism associated with thyrotoxicosis calls for an increase in blood circulation and it will now be possible to get a definite impression as to whether this rise is due to an increased pulse rate, a rise in the systolic output of the heart, or both.

It is a well known fact that the pulse rate is increased in cases of thyrotoxicosis. Tachycardia is perhaps the symptom most constantly observed. In this study, as is shown diagrammatically in Figure 1, the pulse rate increased with the increasing basal metabolism even though this rise was somewhat short of the normal ratio (the full line). On reexamination the pulse rate had become normal and so had the basal metabolic rate (Fig. 2).

Turning to the systolic output of the heart I observed some tendency toward a rise in the systolic output with an increasing basal metabolic rate, but no definite correlation seemed to exist between the two constants. The systolic output is indicated in Figure 3 by the reduced amplitude, the values of which normally range around 47 (Ipsen).

The minute volume of the heart must of course be increased. Bansi has found an increase of 80 per cent, Liljestrand and Stenstrom have observed an increase of 80 to 100

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TABLE 1.—*Behavior of P Wave*

Before operation	On reexamination: Compression of the trachea and increased P_2	No compression of the trachea; no increased P_2	Patient failed to return	Total
Compression of the trachea and increased P_2		6		6
Compression of the trachea without increased P_2 ...		32		32
No compression of the trachea and no increased P_2 .	1	43	3	47
	1	81	3	85

per cent in 11 patients, with a rise in basal metabolism of 64 to 71 per cent. Expressing the minute volume of the heart by means of the Zander index, which normally varies around 35. According to Ipsen, I noted an increase in the minute volume with increasing basal metabolism. On reexamination the Zander index fell to a normal level.

I am consequently able to demonstrate—though the reliability of the reduced amplitude and the "Zander index" must be taken with certain reservations—that the minute cardiac volume in patients with thyrotoxicosis is considerably increased, chiefly by an acceleration in the pulse rate but also by an *increase in the systolic output of the heart.*

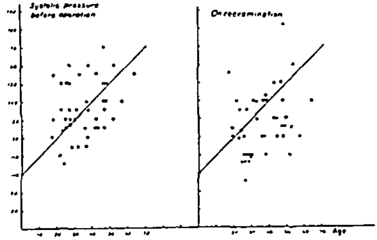
As to the question whether, in addition, increased utilization of blood oxygen is present, no agreement has been reached. Liljestrand and Stenström have noted an increase of 20 per cent and Gladstone an increase of 37 per cent, whereas the Danish author Espersen has found the rate of utilization to be the same in patients with thyrotoxicosis and in normal subjects.

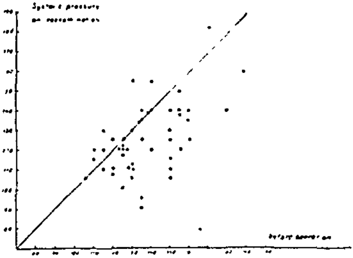
It is a well-known fact that thyrotoxicosis may cause auricular fibrillation. Even the old clinicians (Pierre Marie, Kocher, Murray, Schulze) observed that arrhythmia occurs with a frequency varying from 4 to 9 per cent in cases of exophthalmic goiter, and the Danish physician Fridericia, as early as 1916, observed auricular fibrillation in 6 per cent of 422 patients with thyrotoxicosis. The most recent statistics show auricular fibrillation present in 10 to 15 per cent of cases. This symptom may —and fairly often does—appear transitorily, as has been noted by Fahrenkamp (1914), Warburg (1929) and many others.

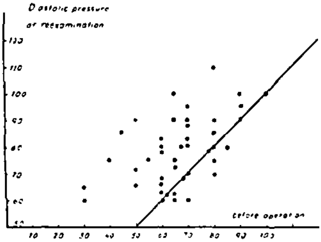
The next consideration is the occurrence of cardiac symptoms that cannot be diagnosed except by means of the electrocardiogram. A brief survey of the peculiar features of the P wave is indicated (Table 1).

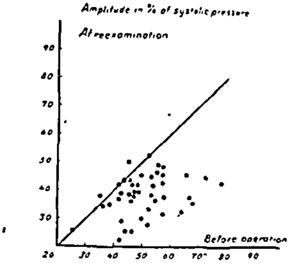
According to the literature, the P wave has been increased in 25 to 60 per cent of cases of thyrotoxicosis, the increase as a rule occurring in the second lead. In my own experience the increase was observed in only 6 per cent, but this low frequency may have been due to the strictness of the criteria (Astrup). According to Astrup, the P wave must exceed 0.12 second in width and 0.25 millivolt in height in order to represent an increase. It is interesting that Geraudel has seen the P wave in the second lead vary greatly from highly positive to negative in periods synchronous with the dyspneic phases of coincident Cheyne-Stokes respiration in a case of the very rare syndrome which I have designated as "double auricular action with one-sided block," the "double commande auriculaire" of the French. The ground for study of the electrocardiographic changes associated with anoxemia has been cleared by brilliant experimental studies carried out by Kaj Larsen (of Professor Warburg's department), who in 18 of 20 patients, i.e., 90 per cent was able to demonstrate an increase in the P wave in the second lead. Even if no exact parallel may be drawn between Geraudel's extremely ill patient, the experiments carried out by Kaj Larsen and thyrotoxicosis with

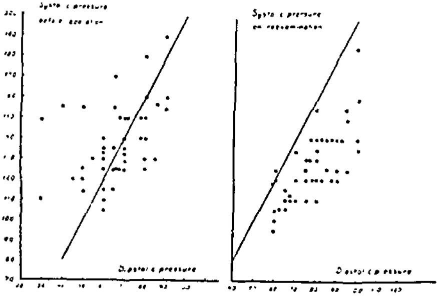
Fig. 1.—Correlation of data. Reading from left to right and from top to bottom, the graph shows successively the relations between preoperative and postoperative systolic blood pressure and the age of the patient; preoperative and postoperative systolic blood pressure levels; preoperative and postoperative diastolic blood pressure levels; preoperative and postoperative amplitudes of blood pressure; systolic and diastolic blood pressure levels before and after thyroidectomy, and basal metabolism and the pulse rate in patients with thyrotoxicosis.

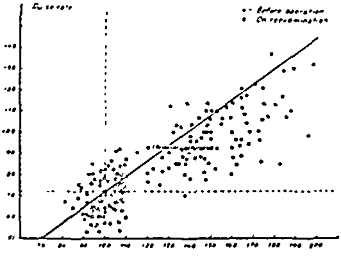

Systolic pressure before operation
On reexamination
Age


Systolic pressure on reexamination
Before operation


Diastolic pressure on reexamination
120
110
100
90
80
70
60
50
10
20
30
40
50
60
70
80
90
100
Before operation


Amplitude in % of systolic pressure
At reexamination
90
80
70
60
50
40
30
20
30
40
50
60
70
80
90
Before operation


Systolic pressure before operation
Diastolic pressure
Systolic pressure on reexamination
Diastolic pressure


Pulse rate
Before operation
On reexamination

compression of the trachea, it is of interest to see whether any correlation exists between disease of the trachea and the large P wave I have consequently made a study of my own material from this point of view.

My tabulation made it evident that the tracheal disease did not persist in any of the 38 patients in whom the trachea was compressed prior to the operation Further, a coincidence of tracheal disturbance and an increased P wave occurred in 6 of the 38 cases, i.e., 16 per cent If the trachea was compressed prior to the operation and there was no change in the P waves (32 cases), no such electrocardiographic change appeared on reexamination In every instance of concurrent disease of the trachea and increased P wave (6 cases), the recovery of the tracheal lesion ran parallel with a disappearance of the P wave anomaly. These facts tell nothing conclusive about a direct etiologic connection between the increased P wave and compression of the trachea, but they may give some useful hints I have, however, been fortunate enough to treat—and twice operate upon—a patient whose case affords reliable and important information concerning the etiologic connection just mentioned

A man 47 years old had rather severe thyrotoxicosis, the basal metabolic rate being 171 per cent. He suffered from severe cardiac symptoms and the electrocardiograms showed left axis deviation (low T_1, diphasic T_2) but no changes in the P waves; roentgen examination showed no compression of the trachea He was treated with iodine, during which treatment T_1 increased and T_2 became isoelectric After preliminary iodinization, operation was performed On reexamination two years later [illegible] showed no clinical symptoms of thyrotoxicosis [illegible] but his basal metabolic rate was 144 per [illegible] relapse of the type designated [illegible] Thyrotoxicosis"; no cardiac [illegible] ent, and the electrocardio- [illegible] ept for left axis deviation [illegible] ntgen examination showed [illegible] on of the trachea. After a [illegible] a second operation he [illegible] diograms showed a left [illegible] waves were normal and [illegible] compression of the [illegible]

[illegible] this case I think it [illegible] that the relatively frequent occurrence of an increased P_2 wave in thyrotoxicosis is an expression of the reaction of the heart to a mechanical influence upon the trachea in the form of a compression, a dislocation or perhaps both.

Many attempts have been made to map out the so-called typical electrocardiogram associated with thyrotoxicosis I shall mention only a few facts In the presence of thyrotoxicosis there may be left axis deviation, which in some cases disappears after the operation; or there may be left axis deviation with a large S wave in the second lead.

More important, however, are the changes in the T waves. These changes have been studied by several investigators since Hoffmann, in 1910, first called attention to their occurrence. In the literature the T waves have been described as increased, small, inverted or even diphasic Now the opinion has been reached that the changes may be low, diphasic or, most frequently, inversional. These changes have been observed prior to operation in 9 4 per cent of my material. It is a remarkable fact that inversion of the T waves may be transitory, just as the auricular fibrillation is transitory, and that even then the changes may occur postoperatively, as I have observed several times

Occasionally a large Q_3 has been observed in cases of thyrotoxicosis There may be further increased R waves or depression in the S-T segment, which I have observed twice; in both cases the electrocardiogram was normal after the operation. Finally, extrasystoles may be encountered (2.1 per cent of my own cases).

A good deal of interest is attached to the occurrence of small deflections in the third lead—an anomaly usually taken to signify changes in the topographic aspects of the heart. In my material this phenomenon was encountered in 4 cases, and in 2 of these, both of which were cases of nontoxic nodular goiter, the electrocardiogram was normal after the operation and remained normal. The question then suggested itself: Is it possible by thyroidectomy to alter the position of the heart? Naturally, one would hardly expect to encounter any great topographic changes, but in both of these cases the goiter was very large, endothoracic and deeply located, extending far down into the anterior mediastinum *on the*

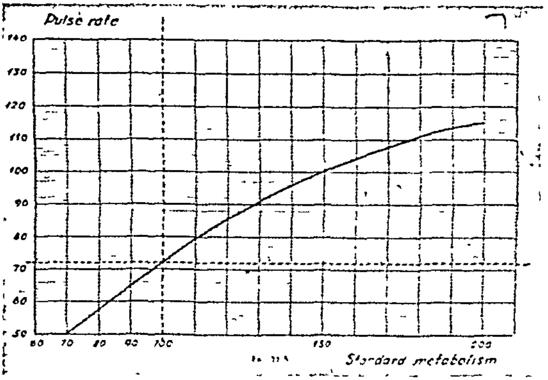


Fig. 2.—Line graph showing the relation between basal metabolism and the pulse rate in patients with thyrotoxicosis.

left side, and it is quite conceivable that the topographic aspects of the left anterior mediastinum were altered somewhat by the forward dislocation of such a goiter Hence it does not seem altogether unreasonable to assume that the altered topographic conditions in the thorax brought about by the goiter may have been the cause of the electrocardiographic abnormalities in these 2 cases

In the other 2—both cases of nontoxic nodular goiter—the electrocardiograms were unchanged on postoperative reexamination of the patients; nor were any changes of this kind to be anticipated, as in neither case did the goiter seem likely to alter the internal topographic aspects of the thoracic cavity

With regard to roentgen examination of the heart, reports in the literature are amazingly scanty. In my own material, 19 per cent of the patients showed cardiac enlargement. The cardiac enlargement accompanying this condition has invariably been moderate. Expressing the width of the heart in percentage of the width of the chest, it will normally be less than 50 per cent. In this study the widest heart observed (except in patients who had cardiac disease of nonthyrogenous origin) measured 57.7 per cent. In 56 per cent the width was 50 to 53 per cent; in 22 per cent it was 53 to 56 per cent, and in 22 per cent it exceeded 56 per cent.

The distribution of these 16 cases may be tabulated as follows, according to the width of the heart (Table 2).

TABLE 2.—*Width of Heart in 16 Cases*

Percentile width of the heart	Percentile number of patients
50-53	56
53-56	22
56	22

It has been emphasized that thyrotoxicosis gives rise to a typical change in the form of the heart; namely, prominence of the pulmonary arch. In my material this change in form was observed in 8 cases, and it is rather interesting that none of the 8 patients presented any increase of the P_2 wave in the electrocardiogram. In 6 of these cases of thyrotoxicosis the patient showed no other cardiac symptoms than a roentgenographically demonstrable increase in the width of the heart.

The roentgen observations on reexamination are shown in Table 3

Of 6 patients who presented a roentgenographic increase in cardiac width, reexamination showed a normal heart in 4, while the heart was still enlarged in 2, for no discoverable reason. In this connection a particularly illustrative case may be mentioned. A patient was admitted with a greatly dilated heart, but shortly after the operation it was noticeably smaller; finally, on reexamination, it was normal.

In 6 of the 8 cases in which I observed prominence of the pulmonary arch this phenomenon had disappeared on reexamination; it persisted, though to a lesser degree, in 1. One patient failed to return for reexamination.

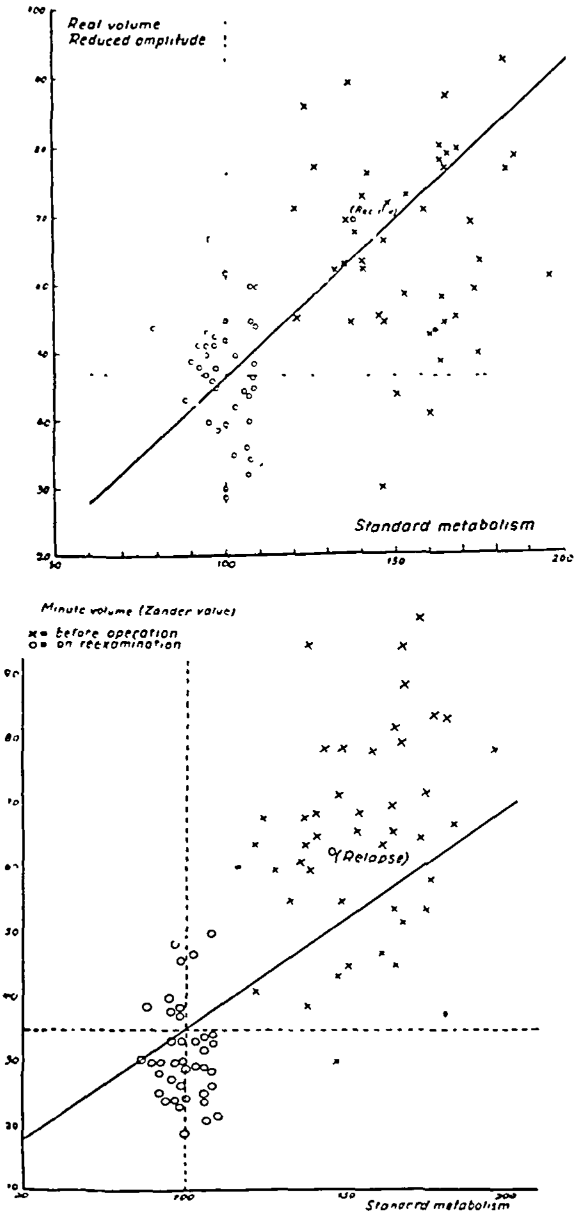


Fig. 3.—*Above,* relation between the systolic output of the heart (reduced amplitude) and the basal metabolic rate in the presence of thyrotoxicosis. *Below,* relation between the minute volume ("Zander value") and the basal metabolic rate in the thyrotoxic patient.

Thus, it is evident that the roentgenographically demonstrable increase in the width of the heart due to thyrotoxicosis has a good prognosis in operative treatment of the thyroid condition. Some American and French authors have claimed that once the heart is dilated it does not become smaller after successful operative treatment of the thyrotoxicosis, even though the other cardiac symptoms may subside. These assertions are not confirmed by my experience. On the contrary, I have been able to demonstrate that the dilated heart will often become smaller, and may do so very promptly, when the thyrotoxicosis is cured.

One purpose of this analysis of the cardiovascular symptoms is to point out that patients with tachycardia and increased amplitude of blood pressure are probably affected by thyrotoxicosis; if, in addition, transitory auricular fibrillation is present, the probability becomes a certainty. It should be emphasized further that the cardiovascular symptoms, even the auricular fibrillation, do not constitute any contraindication for operation; on the contrary, they strengthen an indication already present.

Recent investigations of the clinical features of thyrotoxicosis represent an effort to clear up another of the more easily accessible clinical criteria, viz., exophthalmos, a problem all the aspects of which are as yet a long way from being fully solved. A glance at statistical records shows that in many cases of thyrotoxicosis this symptom is absent, its frequency being given at figures ranging from 15 per cent in Wahlberg's material to 89 per cent in the material of Brodersen and Harbitz; in my own material it is 64 per cent. These figures show lucidly that typical thyrotoxicosis may occur without exophthalmos. It is a well known fact that exophthalmos does not accompany the other clinical symptoms after treatment; indeed, in some cases it progresses after treatment, even in the presence of malignant disease (Naffziger).

Table 4 illustrates a study of my own.

This table shows that the exophthalmos disappeared entirely after the operation in 49.2 per cent of the 59 patients reexamined (1 failed to return for reexamination). In 28.8 per cent of the cases the exophthalmos decreased considerably. Therefore, 78 per cent of my patients showed complete recovery or considerable improvement of the exophthalmos after the operation. Only in 18.6 per cent did this phenomenon remain unchanged, and in 2 patients (3.4 per cent) it was slightly aggravated, although these patients otherwise recovered completely, showing no residual symptoms of thyrotoxicosis.

The actual facts concerning the etiology and genesis of exophthalmos are few. Theories, on the other hand, are abundant, though often more or less speculative. Genetically they may be classified under three main heads:

1. Increase in the contents of the orbit.
2. Contraction of certain orbital muscles.
3. Hypotonia of the extrabulbar orbital muscles.

Increase in the Contents of the Orbit.—Although theories that attribute exophthalmos to an increase in the orbital contents are the oldest of all, they still persist. These theories assume that an increase in the retrobulbar adipose tissue of the orbit forms the anatomic foundation for exophthalmos—a view advocated by Basedow as early as 1840.

Three arguments have been brought against this view. In the first place, the otherwise extreme emaciation of these patients, which is in striking conflict with the view that an *accumulation of fat* must be the anatomic foundation for the phenomenon; second, the negative results of autopsy, and finally, the fact that exophthalmos may develop so rapidly or set in so suddenly, disappearing just as quickly, that it can hardly be attributed to stable anatomic conditions. Several other observations tell against this theory: the bulb may readily be pressed backward, but it resumes its protruding position as soon as the *pressure ceases, and the eyelids are slightly* edematous and show some venous configuration in the more extreme manifestations. This has called attention to the possibility that changes in the blood content of the orbital vessels may play a role in this respect—a view that finds additional support in the observation that variations in exophthalmos and in congestion of blood in the head (cough, labor pains, etc.) appear to run parallel. Finally, the degree of exophthalmos appears to some extent to depend on mental factors and on menstruation.

Both the arteries and the veins have been mentioned in this connection. Kocher attributed exophthalmos to dilatation of the arteries associated with a secondary increase of orbital adipose tissue. This view has been discarded now, because (among other reasons) the exophthalmos accompanying thyrotoxicosis is never pulsatile. It is far more reasonable to look for the cause of the exophthalmos in dilatation of the veins of the orbit, a view that has been advanced by several authors and adopted by many investigators.

Instead of an "either or" explanation, some investigators have considered a "both and" theory, i.e., both a congestion of the arteries *and a congestion of the veins (Chvostek)* as the anatomic substratum for exophthalmos.

Retrobulbar edema has been designated as another cause of increase in the orbital contents (Foster Moore, Cunliffe Shaw). The view finds some support in the fact that edema of the upper eyelid (Enroth's symptom) is seen occasionally in patients with thyrotoxi

TABLE 3.—*Roentgen Data*

	Patients with auricular fibrillation	Patients without auricular fibrillation	Other patients	Prominence of pulmonary arch	Total
Unchanged	2		2		4
Improved	1		2	1	4
Normal	1	1	8	6	16
Failed to return				1	1
				—	—
				8	25

TABLE 4.—*Exophthalmos*

Reexamination	Preoperative exophthalmos				
	Severe	Moderate	Slight	Varying	Total
Recovered	20%	25%	78.6%		49.2%
Improved	60%	50%	3.6%		28.8%
Unchanged	20%	20%	14.3%	100%	18.6%
Aggravated		5%	3.6%		3.4%
Not reexamined			1		1
Number of patients	10	20	29	1	60

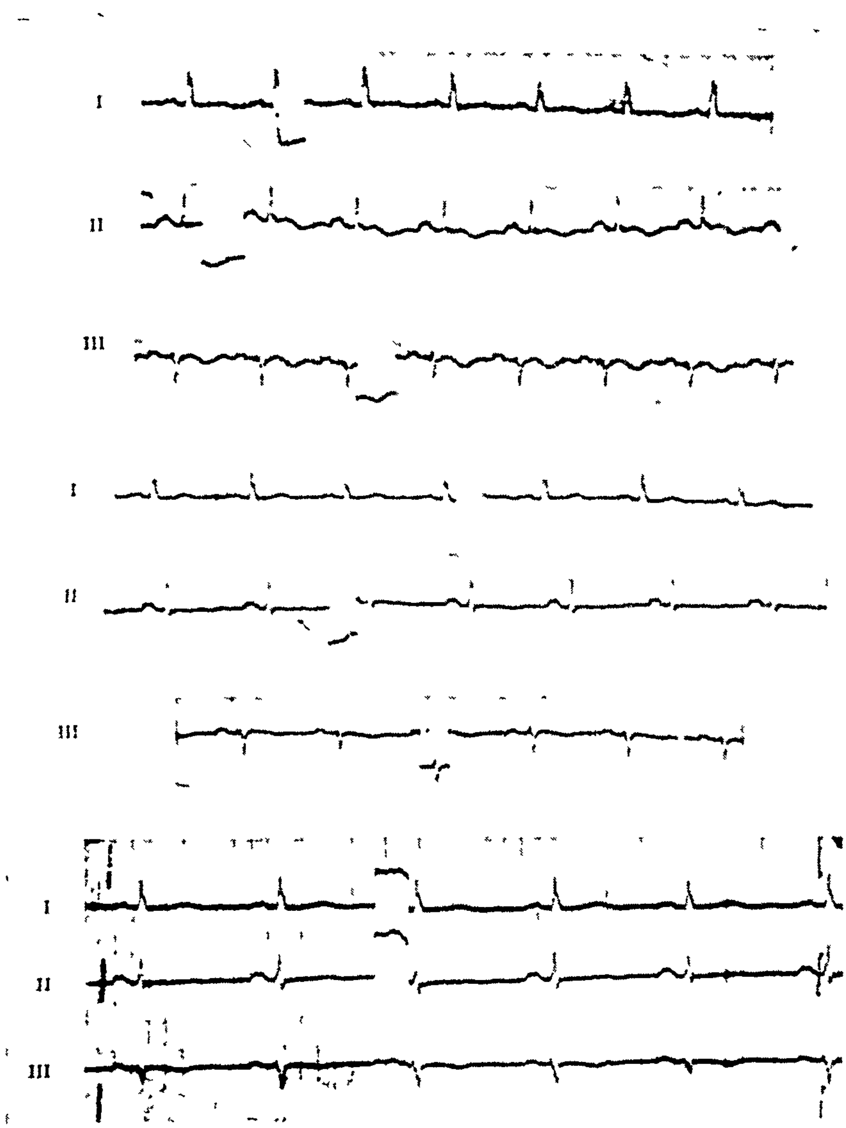


Fig. 4.—Electocardiograms showing changes in the T waves improved by iodinization alone. In addition, an increased P wave, occurring simultaneously with a relapse of the thyrotoxicosis, is demonstrated. The first set of three records was taken one day before iodine treatment was instituted, the second, on the day before operation, and the third, on reexamination (relapse of thyrotoxicosis).

cosis, and it may extend even out into the temporal region (Wahlberg's symptom)

In studies of malignant exophthalmos after thyroidectomy, Naffziger was able to demonstrate that the volume of the retrobulbar muscles was often increased enormously (up to ten ten times the normal volume), owing to an abundant accumulation of fibrous tissue associated with phenomena of degeneration and round cell infiltration.

Askenazy's classic studies (1898) have also demonstrated an interstitial lipomatous muscular atrophy, which was confirmed by Liechte in 1938. He also observed damage to the fibrils, with loss of transverse striation and a waxlike degeneration.

Hyperfunction of Certain Optic Muscles.—Another group of investigators attribute Basedowian exophthalmos to hyperfunction of certain muscles of the eye. Their attention was focused first on the muscle demonstrated by Muller, the contraction of which was claimed directly to force the eyeball forward Other investigations however, led to the conclusion that exophthalmos was due to contraction of the muscle described by Landstrom

Hypotonia and Elongation of the Orbital Muscles—The third group of investigators attribute Basedowian exophthalmos to hypotonia and elongation of the extrabulbar muscular apparatus of the orbit especially the straight eye muscles and the orbicularis oculi The fact that total ophthalmoplegia is never associated with exophthalmos appears in some degree to exclude such a possibility at any rate as the only cause of the exophthalmos But of course this does not exclude the possibility that muscular hypotonia may play some rôle in this connection

Rundle of England appears to have come nearest to the solution of this riddle His investigations were submitted at the April 1947 meeting of the American Association for the Study of Goiter Rundle attached much importance to the great mobility of the bulb and the eyelids Posteriorly the bulb is a closed case, therefore an increase in the volume of the bulb must necessarily press the bulb and the eyelids forward together If the bulb is pressed posteriorly, the eyelids will be pressed correspondingly forward The protrusion most frequently measured in thyrotoxicosis is about 2 mm, corresponding to about 5 per cent increase in the orbital contents Rundle divided the increase in volume into increase (*1*) with fatty tissue and (*2*) without fatty tissue the former representing 70 per cent It is particularly a question of fibrous adipose tissue the muscles likewise are fibrous and adipose Rundle, like many others, therefore considered that it must be a question of an increase in the fatty content of the orbit, in spite of the fact that other organs may be practically devoid of fat Of significance in the clinical picture is protrusion of the eyelids, which Rundle considered the most important feature He recommended examination with the patient's eyes almost closed The weak point of Rundle's argument is that he has not taken sufficiently into consideration the normal changes in the orbital contents brought about by advancing age The changes are considerable far exceeding what would be expected, but even so I have observed in a few preliminary examinations the occurrence of degenerative changes in the extrabulbar eye muscles Here and there

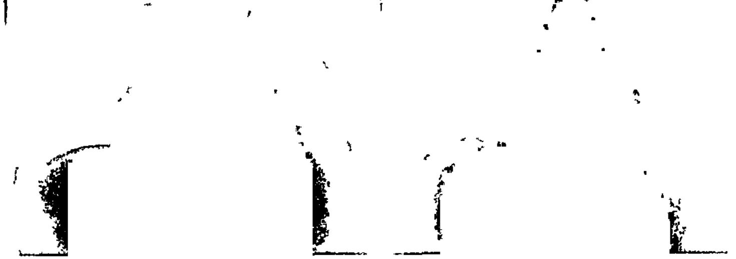


Fig [illegible]—*Left*, roentgenogram of patient with thyrotoxicosis on admission to hospital *Right*, same patient about two weeks after thyroidectomy

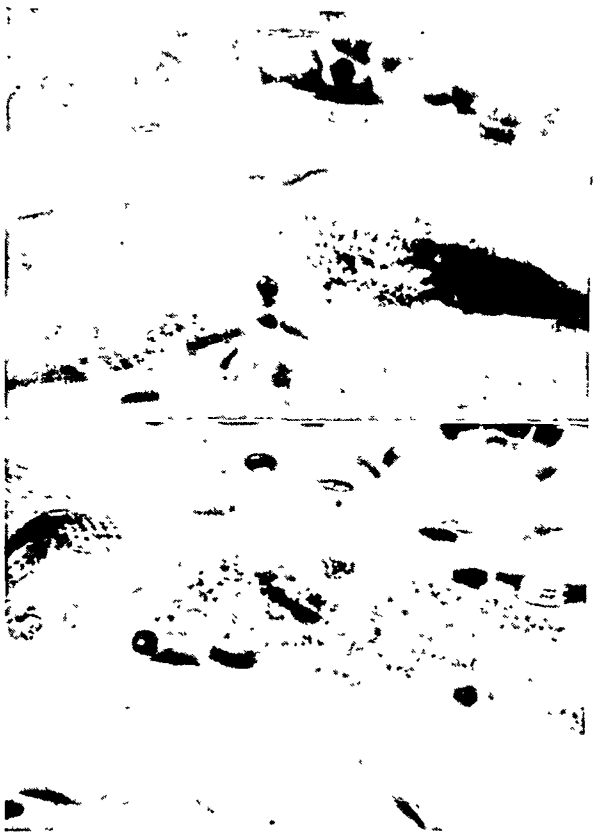


Fig. 6—Degenerative changes associated with thyrotoxicosis and exophthalmos. *Top*, changes in superior oblique muscle of woman aged 44; *bottom*, degeneration and fatty deposits in orbital muscle of woman aged 55. (× 670.)

the myofibrils present indistinct transverse striation or no striation at all, with certain fibrils in a state of "granular crumbling." In certain places accumulations of lymphocytes are evident in the interstitial tissue, as well as a considerable deposition of fatty tissue. Therefore, at least as far as the muscles are concerned, I am able to confirm Rundle's observations; with regard to the retrobulbar fat I shall not venture to express an opinion.

As regards etiology, attention was first focused on the cervical sympathetic nerve, and both toxic and mechanical causal factors have been suggested. That a mechanical influence of the cervical sympathetic nerve may have a certain importance can hardly be doubted, as hemithyroidectomy is able to make exophthalmos disappear on the operative side, while it persists on the other side.

In one of my cases a women 29 years old had a deep, extensive goiter, almost reaching the vertebral column. The manipulations connected with its exposure caused transitory pressure upon the cervical sympathetic nerve, resulting in paralysis of the vasoconstrictors in the homolateral half of the face.

In another case a woman aged 22 showed ocular symptoms that seemed ascribable to the cervical sympathetic nerves. A marked accentuation of the exophthalmos on the left side during and after the operation may well have been due to irritation of the cervical sympathetic nerve through the manipulations performed posteriorly, or perhaps, although less probably, to paralysis of the right cervical sympathetic nerve. The thyroidectomy abolished the irritating pressure, and the exophthalmos subsided, particularly on the side where this pressure was more troublesome. That it was more persistent on the other side is perhaps more difficult to explain, but this may possibly have been due to deep scar formation or to the markedly posterior location of the remnant of the gland.

In a third case, that of a woman aged 22, the conditions were even more variegated. Here too, the findings were suggestive of involvement of the cervical sympathetic nerve; the disease started with ordinary exophthalmos on the right side, combined with Horner's syndrome on the left; the latter subsided spontaneously. During the operation the large retrotracheal goiter, which was larger on the left side, required some vigorous manipulations in order to expose it. It is not surprising that these manipulations produced paralysis of the cervical sympathetic nerve, which temporarily resulted in a complete Horner's syndrome on the right side. After the operation, a remnant of the previous paralytic complex on the left side (Horner's syndrome) persisted, whereas the preoperative hippus disappeared after the operation—an occurrence difficult to explain.

Several facts lend support to the view advanced by Holst concerning the development of exophthalmos as a result of venous dilatation which secondarily gives rise to other phenomena (edema and induration of the orbital contents). The cause of this venous stasis is still obscure, though an increasing number of observations have pointed toward the cervical sympathetic system. It has become increasingly evident that the exophthalmos is more likely to be due to a complex of factors, or that in thyrotoxicosis the exophthalmos and the goiter are coordinate results of the same causal process; recently, indeed, several authors have looked elsewhere for a deeper cause of these phenomena.

At present I am not prepared to take a definite stand as to the question of etiology with regard to exophthalmos. The aim of the present survey is merely to review the facts and theories that have appeared in the literature so far, together with some of my own observations.

One fact should, however, be stressed, a well known fact that has not always been given due attention: that in most cases exophthalmos is a reversible process, disappearing in about one half of the cases.

Another typical symptom is the alteration of the basal metabolism. This is of some help in making the diagnosis and also, more particularly, in estimating the severity of the disease. It is not, however, entirely reliable. I have seen patients with so-called "normal" basal metabolic rates whose condition I had no hesitation in diagnosing as typical thyrotoxicosis, even as presenting the classic picture of exophthalmic goitre.

The basal metabolism, the pulse rate and the loss of weight constitute the numerical criteria at our disposal, and the most reliable of these is the basal metabolism. Increasing basal metabolic rates are accompanied to a fairly corresponding degree by an increasingly low pulse rate, as is evident from Figure 2.

There is furthermore a certain correlation between the basal metabolism and the loss of weight, as most patients with thyrotoxicosis are underweight by normal standards. Nevertheless, it has not been possible to demonstrate any particular proportional correlation between the two factors. It is true that a high rate of basal metabolism (i.e., over 180 per cent) is associated with particularly marked underweight (i.e., about 20 per cent), but the correlation is too feeble to be suitable for any exact clinical or scientific judgment of the patient in question. Further, it is to be kept in mind that a moderate degree of obesity does not exclude the possibility of thyrotoxicosis.

Fig [illegible]—*Top*, Degenerative changes in medial rectal muscle of woman aged 41. *Bottom*, Degenerative changes in lateral rectus muscle of woman aged 41 (× 600).

In my material a couple of overweight patients presented a severe degree of thyrotoxicosis, one of them with a basal metabolic rate of 169-181 per cent weighed 79.5 kg. (height 167 cm.), and the other showed a basal metabolic rate of 155-172 per cent and weighed 68 kg. (height 159.5 cm.).

It is not possible, then, to measure the degree of thyrotoxicosis or to express it accurately on the basis of weight loss alone, and an expression of the severity of the disease by means of the pulse rate alone involves considerable technical difficulties, besides being unreliable on account of the great lability which is one of the most important signs of thyrotoxicosis.

In conclusion, there are several different forms under which thyrotoxicosis may appear and which do not seem to be as well known as they should be. I have reported a case in which there was enlargement of the [illegible], which

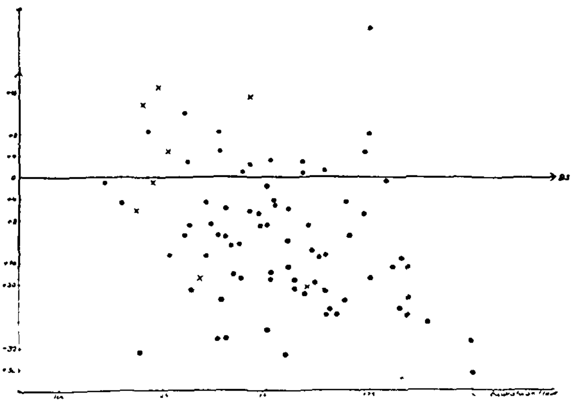


Fig. 8.—Relation between body weight and the basal metabolic rate in the presence of thyrotoxicosis.

is clearly illustrative of the form which Holst has designated "latent thyrotoxicosis," a morbid state in which there are no manifest clinical signs of thyrotoxicosis, its presence being revealed by determination of the basal metabolism.

Attention should also be directed to the type Lahey has called the "apathetic type," which perhaps represents a late stage—a "burnt-out" stage (Crile)—really a far more dangerous form than the active. This "apathetic type" is seen relatively often in elderly patients, who present no particularly active picture. They often have cardiac symptoms, but only moderate tachycardia; they are often subjected to a very radical operation, after which they enter into a postoperative state of apathy leading to death in deep apathy, which forms a striking contrast to the wild excitation of the typical postoperative thyrotoxic storm.

I shall not deal in detail here with recent investigations of the diagnosis of this condition by means of radioactive iodine and Geiger Counter, as submitted by Chapman of Boston. First, I consider it outside the scope of a clinical account, and second, I find that, however interesting these studies may be from a theoretical point of view and however great significance they may prove to have scientifically, for the moment at least they fall outside the scope of practical clinical diagnosis.

On the other hand, it is to be expected and sincerely hoped, that determination of the organic iodine fraction may be utilized to a somewhat greater extent than it has been heretofore. As early as 1928 Holst made some investigations on this subject, as did Gerda Biilmann in 1938; on account of technical difficulties associated with the analysis it has, unfortunately, been employed far too little, but this method seems to me to be *the* way in differential diagnosis and in the estimation of the effect of treatment.

SUMMARY

In the author's opinion, the most important clinical criterion for thyrotoxicosis is the combination of tachycardia and increased pulse pressure; when to these is added an unexplainable perpetual arrhythmia, in some cases transitory, a syndrome exists which is tantamount to thyrotoxicosis. The presence of exophthalmos, especially after examination with almost closed eyes, will, of course, greatly support the diagnosis when present; the absence of it means very little.

The basal metabolic rate provides an excellent measure for the degree of thyrotoxicosis, but the tachycardia will, as a rule, greatly assist the surgeon's judgment. Loss of weight is a reliable symptom but does not indicate much about the degree of thyrotoxicosis.

As regards indications for active treatment, especially operative intervention, the cardiac complications are no contraindication; on the contrary, they intensify the indications.

Determination of the organic iodine fraction should be considered a regular feature in diagnosis.

RÉSUMÉ

Dans l'opinion de l'auteur, le critérium clinique le plus important pour la thyrotoxicose est la combinaison de tachycardie et d'augmentation de pression arterielle. Quand à celà est ajoutée une arrythmie perpetuelle inexplicable dans certains cas transitoires, un syndrome existe qui indique la thyrotoxicose. La présence d'exophthalmie surtout après examen avec les yeux presque fermés, supportera naturellement le diagnostic; son absence signifie peu.

Dans le taux metabolique basal, nous avons une excellente mesure pour le dégré de thyrotoxicose mais la tachycardie en général nous est d'une grande utilité. L'amaigrissement est

un symptôme de valeur mais n'indique pas le dégré de thyrotoxicose

En ce qui concerne les indications pour le traitement actif, surtout operatoire, les complications cardiaques ne sont d'aucune contre indication au contraire ils intensifient les indications

La determination de la fraction de l'iode organique devrait être considérée comme utile dans le diagnostic

RIASSUNTO

Il criterio clinico piu' importante per la diagnosi di tireotossicosi e' l'associazione di tachicardia e di ipertensione la diagnosi diventa ancora piu' sicura allorquando si aggiunga un'aritmia talvolta temporanea, talvolta persistente che non puo' essere altrimenti spiegata La presenza o meno, di un esoftalmo ha invece un'importanza relativa nel senso che la mancanza di un esoftalmo non esclude di per se una tossicosi

Il metabolismo basale e' un ottimo indice del grado di tossicosi minore importanza ha invece un'eventuale perdita di peso La diagnosi dovrebbe sempre includere una determinazione della frazione organica dell'iodio

In quanto alle indicazioni per un intervento operativo, l'A ritiene che le complicazioni cardiache non rappresentino una controindicazione all opposto queste renderebbero l intervento piu' imperativo

ZUSAMMENFASSUNG

Nach meiner Auffassung ist das wichtigste Kennzeichen der Thyreotoxikose die Kombination von Herzbeschleunigung und erhoehtem Pulsdruck kommt dazu noch eine unerklaerte dauernde oder—in manchen Faellen—voruebergehende Arrhythmie dann liegt ein Syndrom vor das gleichbedeutend mit Thyreotoxikose ist Das Bestehen eines Exophthalmus besonders bei Untersuchung mit fast geschlossenen Augen wird natuerlich die Diagnose wesentlich stuetzen, seine Abwesenheit aber ist von geringer Bedeutung Der Grundumsatz gibt uns einen ausgezeichneten Maasstab fuer den Grad der Thyreotoxikose, in der Regel wird aber die Pulsbeschleunigung ein grosses Hilfsmittel in unserer Beurteilung sein Gewichtsverlust ist ein zuverlaessiges Symptom besagt aber nicht viel ueber den Grad der Thyreotoxikose Was die Indikationen zu aktiver Behandlung, besonders der chirurgischen betrifft, so stellen die Herzkomplikationen keine Gegenanzeige dar, im Gegenteil sie unterstreichen die Indikationen

Die Bestimmung der organischen Jodfraktion sollte als ein regelmaessiger Bestandteil der Diagnostik gelten

RESUMEN

En opinión del autor el criterio clinico mas importante para la tirotoxicosis es la combinacion de taquicardia y aumento de la presion arterial Cuando a esto se agrega una arritmia continua inexplicable existe un sindrome que es equivalente a tirotoxicosis La presencia de exoftalmía especialmente después del examen con los ojos casi cerrados, apoyara grandemente el diagnostico en caso positivo teniendo en caso negativo escasa significacion

En el metabolismo basal se tiene una excelente medida del grado de la tirotoxicosis pero la taquicardia asistira grandemente como regla a nuestro juicio Un sintoma seguro es la perdida de peso, pero no es indicación bastante del grado de tirotoxicosis

En lo que atañe a las indicaciones para el tratamiento activo especialmente la intervencion operatoria no constituyen contraindicacion las complicaciones cardiacas pues al contrario refuerzan la indicacion Habria de considerarse regularmente en el diagnostico la determinacion de la fraccion de iodo organico

Clinically Benign Gastric Ulcer

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A LOGICAL, scientific approach to clinically benign gastric ulcer has not been universally accepted, only because of failure to realize the potentialities of such a lesion. To obtain a concrete basis justifying the surgical treatment of clinically benign gastric ulcers, 400 cases from the Mayo Clinic observed in 1942 and 1943 have been thoroughly studied. The investigation excluded any case in which malignant disease was expected after complete history, physical examination and laboratory procedures were done, including roentgenologic and gastroscopic examinations. In order to give the proper treatment, statistics were compiled which would be useful in determining the nature of the lesion. It was thought that such data as the size and location of the gastric ulcer might be helpful, since there are many controversial opinions regarding these points.

The most common clinical symptoms are pain, hemorrhage, vomiting, changes in weight and alimentary relations. Whether or not these symptoms would help to determine the possibility of malignant disease could be proved only by a thorough review of the history of patients submitted to surgical treatment and the ulcers available for histologic interpretation.

In spite of all human faculties and the aid of modern technical procedures, there is enough possibility of error in diagnosis to indicate that no person should accept the responsibility of telling a patient that he has a benign ulcer without recognizing the possibility of cancer.

Although it is primarily true that in cases of duodenal ulcer one should treat the patient rather than the ulcer, in the presence of gastric ulceration it may be well to treat the ulcer primarily and the patient secondarily. To handle the situation successfully one must be able to answer these questions:

1. What percentage of clinically benign gastric ulcers are malignant?
2. What is the ultimate outcome of medically treated gastric ulcers?
3. What is the ultimate outcome of surgically treated gastric ulcers?
4. What is the surgical mortality?

The fact must be accepted that patients treated medically for gastric ulcer show a notable percentage of recurrence and later show proved gastric carcinoma. In order to determine the surgical management it is necessary to familiarize oneself with the morbidity, mortality, and recurrence rates that follow operations on the stomach for gastric ulcer. What road to follow is to be the ultimate purpose of this study.

REVIEW OF LITERATURE

Age is a factor in considering mortality but not in itself a contraindication to surgical treatment, as has been shown by Clagett[1] (Table 1).

Eusterman[2] wrote that the average age of patients with small carcinomas is 52.9 years and of those with ulcers 48.5 years; that ulcer is twenty times more common than carcinoma in the third decade of life. According to Priestley,[3] about 7 per cent of patients with gastric carcinoma on whom gastric resection was performed were 40 years of age or less. Allen[4] stated that patients over 50 who have gastric ulceration with symptoms of less than one year's duration are apt to have cancer rather than ulcer in the ratio of 5:1. If the symptoms have existed for five years, the patients are apt to have benign ulcer rather than a cancer in the ratio of 5:1.

The heredity factor in gastric carcinoma has been shown by Bauer[5] to be four times more likely to occur in families with an ulcer history than in families without ulcers. The family

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history in the cases studied was not indicative of any diagnosis.

Walters, Gray and Priestley[6] stated that 31 per cent of 6,242 patients with cancer of the stomach had a history of ulcers. Pain, according to Steigmann,[7] in a large ulcer is likely to be continuous and not sharply localized whether the ulcer is benign or malignant. Chamberlin[8] said that the majority of patients with peptic ulcer have classic symptoms and that in the presence of atypical symptoms one must be skeptical as to the presence of an ulcer.

Wilbur[9] classified the symptoms of gastric carcinoma into three categories: (*1*) "typical" when the patient has anorexia, postprandial discomfort, belching and bloating, nausea, occasional vomiting and later, loss of weight and weakness—about half the patients present this complex; (*2*) "ulcer" exhibiting the pain-food-ease sequence and (*3*) "nondescriptive" when there are vague and insidious symptoms such as gradual weakness, loss of weight and unexplained secondary anemia. It is easy, therefore, to see the overlap of general symptoms in trying to distinguish benign from malignant lesions.

One must not forget the three factors brought out by Priestley,[1] which are commonly responsible for failure to recognize gastric lesions which are still in the curable state. 1. The "lesion factor." Because of its position the lesion may grow to a considerable size before any disturbance is noted in the normal physiologic processes of the stomach. With no mechanical obstruction and little physical discomfort, it is hard to discover this lesion without the aid of routine gastric roentgenograms. 2. The "patient factor." Quite often the patient, perhaps because his symptoms are mild, fails to seek treatment or tries to treat himself with commercial remedies. Financial or social obligations may also be hazards. 3. The "physician factor." In some cases, because of lack of correlation of all data after a thorough history and physical examination, the need for roentgen study is overlooked. Competent interpretations of the roentgenograms is, of course, essential. Unfamiliarity with the possible behavior of gastric ulcers may be the cause of faulty therapy. Table 3 (Gray[11]) shows that delay in roentgen examination plays a definite role in prognosis.

TABLE 1—*Major Operations on Patients Aged 65 Years or More at Mayo Clinic, 1939-1940 (Clagett[10])*

Age, years	Patients	Operations	Hospital deaths: Number	Hospital deaths: Per cent of operations
65-69	756	870	67	8
70-74	337*	341	2	8
75-79	92	101	13	13
80-84	18	19	7	37
85-89	3	3	1	33
Total	1,204	1,364	120	9

*Two patients in this group also are included in the previous age group, therefore they are counted only once in the total.

A change in the early symptoms may suggest malignancy in what was thought previously to be a benign ulcer. Kirklin and Eusterman[12] have warned that a malignant lesion may be characterized by a more continuous course, loss of the pain-food-ease sequence, a more or less constant dull ache and an onset of nausea with loss of appetite.

Warner[13] has computed that in approximately 30 per cent of all cases of carcinoma of the stomach an ulcer type of dyspepsia is present and that 80 per cent of the patients show temporary relief of remissions under medical treatment, which suggests that malignant ulcers do temporarily heal to some extent.

Examination of the stools for occult blood is an important diagnostic procedure for evaluating response to medical treatment and an aid in diagnosing gastric lesions, as has been shown by Gutman.[14] Piersol and Bertz[1] have said that 75 per cent of gastrointestinal hemorrhages *originate in the gastroduodenal area.* Gastric hemorrhage has an effect on surgical intervention in proportion to its severity (Gray and Stalker[15]).

Hematemesis (Rivers and Wilbur[1]) has been caused by intrinsic gastroduodenal lesions in 91 per cent of their series of cases.

According to Kahler and Windsor,[17] the normal gastric PH is 1.6 to 1.8 and a PH of less than 2 is necessary for peptic activation. The amount of free hydrochloric acid necessary to bring an average meal to the normal physiologic postmeal range would be slightly over 100 cc. of normal hydrochloric acid. In cases studied by Wolf and   ised acid

TABLE 2.—*Operations for Lesions of the Stomach on Patients 65 Years of Age or More, 1939-1940 (Clagett[1])*

	Operations	Operable lesions Hospital deaths Number	Operable lesions Hospital deaths Per cent	Inoperable lesions Hospital deaths Number	Inoperable lesions Hospital deaths Per cent
Benign	76	4	5		
Malignant	63	7	11		
	75			9	12

Malignant Lesions of the Stomach (Clagett[1])

	Number	Number	Per cent
Men	109	14	13
Women	28	2	7

TABLE 3.—*Malignant Lesions of the Stomach (Gray[11])*

Duration of Symptoms	Cases, per cent	Average number of months from Onset of symptoms to examination by physician	Average number of months from Examination by physician to roentgen examination of stomach
6 months or less	45	1.9	0.9
7-12 months	11	1.8	5.1
13-24 months	18	2.8	13.3
More than 2 years	26	15.8	22.1

secretion produced by anxiety, hostility and resentment caused vigorous contractions of the stomach. This hypermotility produced hyperemia and mucosal erosions, which, when in contact with acid gastric juices, produced further secretions and engorgement. Prolonged exposure was responsible for the development of chronic gastric ulcer. The mucus secreted from the mucosa produced a protecting layer over these small erosions and thereby enabled them to heal within a few hours. If they did not heal, an ulcer developed.

Hener and Holman[20] analyzed 163 cases in which gastric resection and gastroenterostomy had been performed for peptic ulcer. Postoperatively only 37.4 per cent of the patients had achlorhydria or low acidity, yet 83.4 per cent gave satisfactory clinical response, which in the opinion of these authors proved that reduction of acidity was not the only factor in maintaining clinical results. After gastroenterostomy there is no significant change in gastric acidity, yet 75 per cent of the patients were asymptomatic for six to ten years. Hener and Holman concluded that acid dilution and neutralization, rather than acid reduction, is the effective means of achieving these satisfactory clinical results, and that acid dilution and neutralization is the important factor in the genesis of the ulcer.

In the experience of Holman and McSwain,[21] when the antrum of the stomach was removed 25 per cent of the patients showed postoperative acid reduction or anacidity. When one-half to two-thirds resection was performed, plus resection of a portion of the lesser curvature, 80 per cent showed reduced acid levels or anacidity, and when more than two-thirds of the stomach was resected, 90 per cent gave evidence of these conditions.

Wangensteen[22] and Ivy and his co-workers[23] found that jejunal pedicle grafts were ineffectual in changing gastric acidity.

In the cases of Winkelstein and Berg,[24] patients who underwent partial gastrectomy for gastric ulcers on the lesser curvature became achlorhydric and had no recurrences. Only 50 per cent of patients undergoing extensive gastric resection for duodenal ulcer were apparently achlorhydric. Most patients who had duodenal ulcers associated with high preoperative acid levels and underwent partial gastrectomy accompanied with subphrenic section of the vagus nerve remained achlorhydric postoperatively. These authors, therefore, recommended subphrenic anterior or anterior plus posterior vagotomy alone or with gastric procedures.

Merendino and his associates showed that caffeine is a stimulating agent which increases gastric acidity and suggested that caffeine containing beverages be withheld from ulcer patients.

Harper expressed the opinion that development of hyperacidity due to reflex nervous stimulation follows the formation of duodenal ulcers.

Carman and Kirklin[18] have deftly utilized barium studies of the stomach to help differentiate the malignant from the benign lesion. The meniscus complex, which is a meniscal form of crater surrounded by a translucent zone (the overhanging edge of the crater), almost invariably means malignancy. Certain carcinomatous ulcers show only a niche in the stomach similar to that of a benign ulcer. If the crater is irregular and there is absence of normal motility and tenderness, or if the surrounding rugae of the mucosa are absent malignancy is probably present. An increase in the size of the crater is held to be suspicious, as is the location of an ulcer situated on the greater curvature.

Kirklin and Eusterman[17] have shown in contrast that an ulcer with a smooth crater, normal rugae marked spasm and tenderness is in all probability benign.

Scott Merle and Mider have warned against confusing prepyloric ulcer with duodenal ulcer on roentgen examination.

An interesting report from Kirklin and McCarty concerned 190 cases of ulcerous prepyloric lesions analyzed after roentgen interpretation. Cases in which carcinoma were definitely diagnosed were excluded. Breaking down these cases into four brackets we have the following roentgen interpretation and pathological observations.

1 In 47 cases the niche producing lesion was purely ulcerous without signs of malignant growth. The pathologic observations were as follows

Benign prepyloric ulcer 34 cases
Malignant ulcer, 5 cases
Ulcerating carcinoma 3 cases
Duodenal ulcer 5 cases

In this group about 15 per cent of the lesions were malignant.

2 In 26 cases the diagnosis was ulcerating lesion at the pylorus. The pathologic observations were as follows

Benign prepyloric ulcer, 9 cases
Malignant prepyloric ulcer, 2 cases
Ulcerating carcinoma, 10 cases (5 of the lesions were reported as probably malignant)
Duodenal ulcer 4 cases
Carcinoma of the pancreas 1 case

3 In 100 cases a diagnosis of obstructing lesions at the pylorus was made with the following pathologic observations

Benign prepyloric ulcer, 9 cases
Ulcerating carcinoma, 43 cases (19 lesions were reported as probably malignant)

TABLE 4.—*Results of Medical Treatment of Gastric Ulcer (Judd and Priestley[32])*

Result	Cases	Per cent
Cure	68	46.5
Symptoms absent if medical regimen is followed	23	15.8
Gastric ulcer present roentgenologically	7	4.8
Operation for gastric ulcer	16	11.0
Definite evidence of carcinoma developed	14	9.6
Death from hemorrhage	1	0.7
Deaths from unrelated causes	17	11.6
Total	146	100

Duodenal ulcer, 44 cases
Carcinoma of the pancreas, 3 cases
Carcinoma of the gallbladder, 1 case

4. In 17 cases a diagnosis of duodenal ulcer was made. The pathologic observations were:

Duodenal ulcer plus benign prepyloric ulcer, 2 cases
Benign prepyloric ulcer, 9 cases
Malignant prepyloric ulcer, 1 case
Ulceration carcinoma, 5 cases

Gastroscopic examinations, with gastrophotography as described by Rafsky,[31] is helpful in a number of cases. Templeton and Schindler[32] have shown that ulcers of the stomach missed by the roentgenologist have been accurately diagnosed and followed with the gastroscope.

Schindler[33] stressed the importance of identifying atrophic gastritis (which can be diagnosed only with the aid of the gastroscope) because of the patient's strong tendency toward the subsequent development of gastric carcinoma. He suggested repeated roentgen and gastroscopic examinations. Christiansen[34] observed that the most common lesion in patients with histamine-refactory achylia is gastritis—either superficial, atrophic or hypertrophic.

Renshaw, Clark, and Forsythe[35] reported 938 gastroscopic procedures in 842 cases. In 217 a significant or major contribution was made; in 566, a minor contribution, and in 160, no contribution. They mentioned four indications for gastroscopic examination: (*1*) failure of roentgent study to reveal the suspected lesion; (*2*) indeterminate roentgen interpretations; (*3*) gastric ulcer, and (*4*) tumors of the stomach not obviously carcinomatous.

Turnbull,[36] in studying 273 cases of prepyloric lesions, noted that 18.9 per cent of the ulcers were malignant and 81.1 per cent benign; 99.3 per cent of ulcerating tumefactive lesions were malignant and 0.7 per cent benign; and of tumefactive lesions, 92.3 per cent were malignant and 7.6 per cent benign. Of these 273 lesions 235, or 86.1 per cent, were malignant and 38, or 13.9 per cent, benign.

Allen and Welch[37] studied 277 lesions diagnosed as benign gastric ulcers; in a follow-up study 14 per cent of the patients were found to have carcinoma of the stomach. Gastroenterostomy was performed in 23 cases because grossly the lesion appeared benign, and in this group 17 per cent of the patients were later proved to have carcinoma.

Allen[4] reported that the benign ulcers in his series averaged 1.7 cm. in diameter and the cancerous ulcers 2.3 cm.

Berger[38] showed that an increase in hyperplasia of the mucous cells of the stomach was associated with a decrease in the number of parietal cells.

Brindley[39] stated that chronic gastritis may be either a complication of gastric ulcer or an etiologic agent in its production.

Raaf[10] observed slightly atypical hyperplastic cells in 19.5 per cent of 118 ulcers of the stomach and a markedly atypical hyperplastic cell in 7.6 per cent. He expressed the opinion that these cells are controlled by some defensive mechanism but may develop into carcinoma.

Thiessen[41] noted an increase of vascularity in cases of ulcer showing early carcinoma. In his experience, patients with an adequate blood supply about the lesion have a better prognosis than do those with a poor blood supply.

Treusch[42] expressed the opinion that no pathologic significance can be attached to changes in the gastric mucosa due to age.

MATERIAL AND METHODS USED IN PRESENT STUDY

In the years 1942 and 1943, approximately 194,000 registrations were made at the Mayo Clinic. About 1 patient in 400 had benign gastric ulcer. One patient in 200 had carcinoma of the stomach; 1 patient in 30 had duodenal ulcer. One in 2,500 had gastric ulcer plus duodenal ulcer. One in 20,000 had duodenal ulcer plus malignant ulcer which was clinically benign. One patient in 3,000 had clinically benign gastric ulcer which microscopically was malignant. One patient in 3,700 had other surgically proved lesions of the stomach, including lymphosarcoma, leiomyoma, leiomyosarcoma, polyps and other benign tumors. Therefore about 1 patient in every 25 cases had a proved organic gastric or duodenal lesion, or 1 patient in every 125 had a proved organic lesion of the stomach.

The 400 cases studied in this series were reviewed and statistics were tabulated under the following headings: age, sex, family history, previous operations, duration of symptoms, melena, hematemesia, vomiting weight changes, pain, food relations, urine, hemoglobin, red blood cells, white blood cells, urea, blood chlorides, carbon dioxide combining power, gastric analysis, roentgen study and gastroscopic examinations Postoperative statistics consisted of the operation performed the size and location of the gastric ulcer and study of microscopic sections of the lesion, *the gastroduodenal junction and the prepy*loric and fundic mucosa

The duration of the lesion from the time of examination to the first appearance of symptoms was recorded as (*1*) less than two months, (*2*) two to six months, (*3*) six months to one year, (*4*) one to three years, (*5*) three to five years, (*6*) five to ten years and (*7*) more than ten years

Pain was recorded with respect to location, radiation, intensity, time of day, and measures producing relief All these statistics were taken from the histories of patients who later underwent gastric surgical procedures

Melena and hematemesis were important symptoms The hemorrhages were tabulated as mild, moderate or marked

Vomiting was a common complaint, and it was noted whether this was associated with nausea and pain, weight loss or various other disorders, or whether it was of the retention type, occurring over a long period These items were put into a subdivision and their value estimated

A marked loss of weight was recorded when the patient lost 30 pounds (13 6 Kg) in one year 20 pounds (9 1 Kg) in two months, or 15 pounds (6 8 Kg) in one month A moderate loss of weight was present when slightly less weight was lost in a somewhat greater amount of time

The gastric acidity was tabulated as increased normal or decreased, depending upon the gastric analysis, the normal total acidity being estimated at 40 to 60 units and the normal free hydrochloric acid level at 20 to 40 units

The stomach was divided into seven areas in order to determine the exact location of the ulcer in the resected organ The areas were as follows (*1*) prepyloric, 2 5 cm from the duodenum, (*2*) lesser curvature, (*a*) at or below

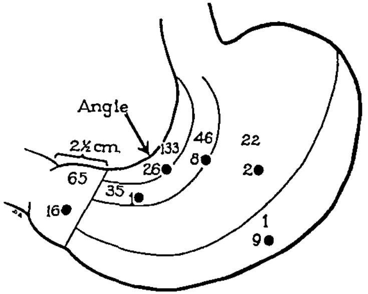

Fig 1 —Location of clinically benign gastric ulcers The dots indicate ulcers that proved to be malignant

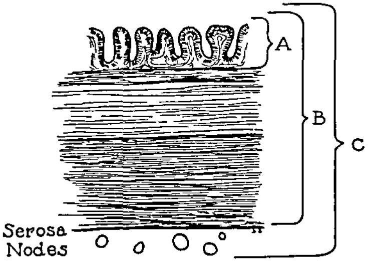

Fig 2 —Dukes' classification of carcinoma as modified by Dochat

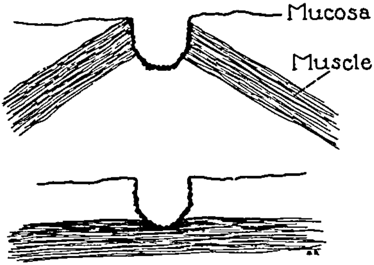

Fig 3 —Muscular layers of the stomach drawn up to the muscularis propria and mucosa The drawing illustrates the primarily benign character of the new carcinomatous ulcer

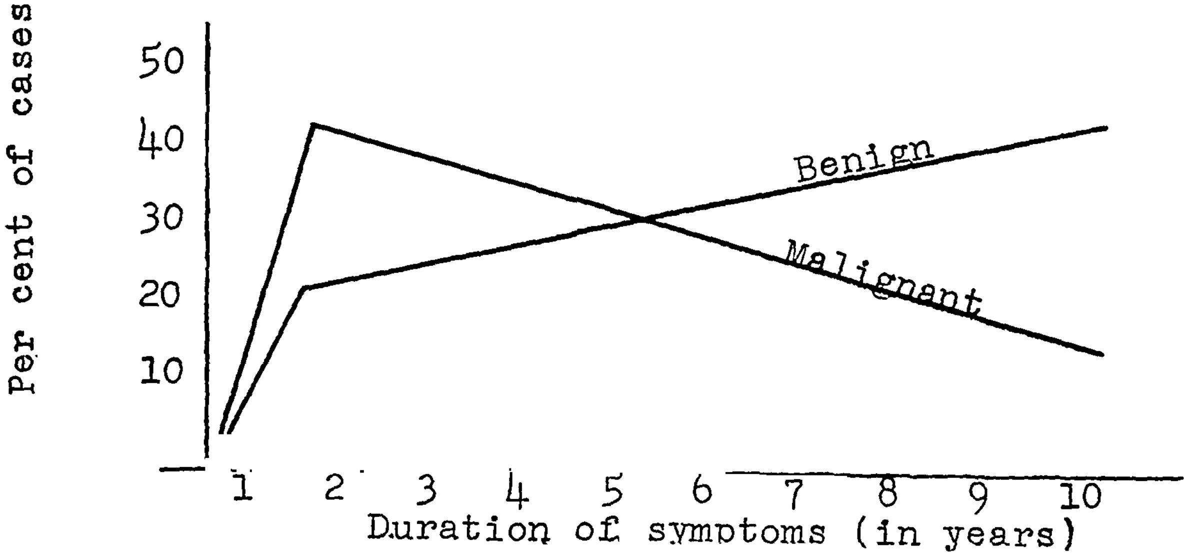

Fig. 4.—Duration of symptoms in 400 cases.

the angle of the stomach and (*b*) above the angle; (*3*) posterior wall near the lesser curvature, (*a*) at or below the angle of the stomach and (*b*) above the angle; (*4*) posterior wall (away from the lesser curvature) and (*5*) the greater curvature.

Four hundred stomachs were sectioned. The diameter of the ulcer was measured, and the exact location was plotted on a drawing of the stomach. Block sections were taken from the ulcer, the surrounding areas and the gastroduodenal area. Primarily the section from the ulcer was taken immediately after surgical removal, and a frozen section was made to give the surgeon an immediate report as to the nature of the lesion.

These surgical specimens were preserved, and the material was used in this study. The sections were stained with hematoxylin and eosin. Approximately 1,100 cut sections were taken from the gross specimens. These were carefully studied under the microscope to determine the presence or absence of malignancy, the character of the vessels, cellular infiltration, muscular arrangement, hyperplasia and regeneration of the mucosal cells. In describing the pathologic picture of the malignant ulcers in this series the classification of Dukes (first described in connection with rectal carcinoma and later, by Dochat, with regard to gastric carcinoma), and the grading of Broders were the methods used.

The roentgen interpretations were made by the roentgenologic department of the Clinic and served as the most reliable means of determining the nature of the lesion. Members of the staff make a special effort to rule out malignancy, and this has proved more reliable than direct visualization (by means of the gastroscope).

RESULTS

Age.—There was a wide variation in age. The youngest patient was 17, the oldest 77. The majority were between 48 and 60. The average age for men was 55 years; for women, 54. The ratio of men to women was 6 to 1. There was no variation in age or ratio when the ulcer was malignant.

Duration of Symptoms.—In this group of patients the duration of symptoms from the time of examination was not as helpful as one might have believed, considering that cases of clinically diagnosed carcinoma of the stomach were excluded.

Figure 4 represents the results in 400 cases. Twenty-two per cent of benign ulcers and 37 per cent of malignant ulcers had a history of less than a year. Thirty-four per cent of benign ulcers had been present ten years or longer, while only 13 per cent of malignant ulcers had a history of this duration.

The average duration of symptoms for benign ulcer was five and nine-tenths years and for the malignant ulcer three and one tenth years

Pain —Pain was the most common complaint, being absent in only 3 per cent of cases of ulcer either benign or malignant To determine the nature of the lesion by the type or location of the pain was impossible Night pain was present in 37 per cent of cases of benign ulcers and in 36 per cent of cases of the malignant type This pain was severe enough to awaken the patient and usually occurred around 1 to 2 a m Pain in the back was present in 8 per cent of cases of benign ulcer and in 9 per cent of cases of malignant ulcer This was due to irritability of the involuntary nervous system especially the celiac plexus Inflammatory reaction due to penetration or local perforation was responsible, in most cases, for the irritability Twenty three per cent of benign ulcers had penetrating or perforating connections to the pancreas and 3 per cent had involved the gastrohepatic ligament Eleven per cent of the malignant ulcers had involved the pancreas with an inflammatory reaction Involvement of the pancreas in the malignant ulcer was observed in 5 cases but this was a surgical description, and in no case had the ulcer completely perforated the stomach wall The attachment to the pancreas was due to inflammatory adhesions easily separated by blunt dissection There was no need to remove any portion of the pancreas because of malignant infiltration nor was it necessary to leave any portion of a malignant ulcer attached to the pancreas Complete perforation of benign ulcer with attachment of the ulcer crater to the pancreas was observed and did necessitate leaving a portion of the ulcer attached to the pancreas

Ninety four per cent of the patients complained of an ulcer type of pain regardless of the type of lesion Twenty per cent of those with malignant ulcers gained no cessation or relief of pain by use of antacids or food whereas only 3 per cent of those with benign ulcers were *not relieved by these means*

The pain food ease sequence was characteristic of 92 per cent of the benign ulcers and in 80 per cent of the malignant ulcers

Vomiting —After pain, vomiting was the most common complaint It was associated with nausea and pain in over 90 per cent of cases Few patients complained of the retention type of vomiting Those who did had long standing chronic prepyloric ulcers or gastric ulcers associated with ulcers of the duodenum with which spasm or obstruction of the pylorus was present The mechanical obstruction was due to edema, cicatricial contraction or irritability Seven patients had retention vomiting Vomiting is so frequently a symptom of various disorders that accompanying symptoms are needed with the history to suspect gastric ulcer Pain precedes the vomiting and is usually relieved by antacids and food—even the foods which exaggerate gallbladder pain and vomiting, this is an important differential diagnostic point

Fifty six per cent of patients with benign ulcers had attacks of vomiting, as against 40 per cent of those with malignant ulcers Vomiting, therefore, could not be used to differentiate between benign and malignant lesions

Melena and Hematemesis —Seventy six patients had notable melena, which is characteristic of hemorrhage in the upper part of the gastrointestinal tract Sixty-five of the 76 also had hematemesis Hemorrhage was usually severe enough to produce clinical signs Seventy

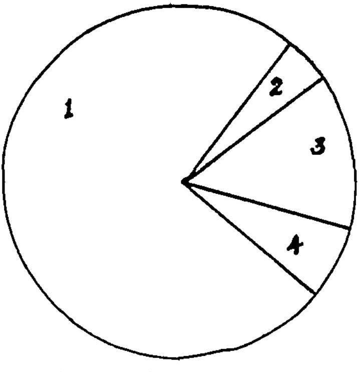

Fig [illegible] —Percentage of occurrence of gastroduodenal lesions as causative factors in hematemesis *1*, ulcer, 76 8 per cent, *2*, benign lesions, 0 8 per cent (myomas, polyps, etc), *3*, carcinoma, 12 6 per cent, *4*, other conditions 9 7 per cent (varices, blood dyscrasias, etc)

(21 per cent) of patients with benign ulcers had noticeable melena, as against 6 (10 per cent) of the patients whose ulcers were malignant.

Hematemesis was noted as a symptom in 71 patients and was twice as common with benign as with malignant ulcers.

In 19 per cent (64 cases) of the benign and 11 per cent (7 cases) of the malignant ulcers there was hematemesis, and 65 patients complained of both hematemesis and melena. Therefore, noticeable bleeding from clinically benign ulcers of the stomach was present in about one-fourth of the cases and was twice as common with the benign as with the malignant ulcers.

Loss of Weight.—Loss of weight, which so commonly accompanies carcinoma of the stomach, should, theoretically, be helpful. In this study it could not be so considered. Marked or moderate loss of weight was present with 79 per cent of benign ulcers and 80 per cent of malignant ulcers. It was due chiefly to pain, vomiting or metastases of malignant lesions.

Gastric Acidity.—Gastric analysis was an important aid in determining the microscopic picture. It was performed in about 90 per cent of the 400 cases.

Four-fifths of the benign ulcers were associated with normal or increased acidity, whereas in four-fifths of the cases of malignant ulcer there was normal or decreased acidity. Regardless of the type of lesion,.the immediate postoperative check on gastric acidity was 0 units of free hydrochloric acid following partial gastric resection in over 90 per cent of the cases checked.

Roentgen Interpretations.—Roentgen study is the most important and reliable means of establishing the presence of lesions in the stomach, but its criteria are not sufficient to provide absolute differentiation of malignant lesions from benign lesions.

In one-third of the 400 cases studied in this series, malignancy could not be ruled out positively either by pathologic study or by roentgen interpretation. For the patient's welfare, it is a sounder policy to lean toward the diagnosis of possible malignancy than to regard the lesion as benign and treat it as such. As Oschner[13] has said, "the best time to treat gastric carcinoma is the time when the diagnosis cannot be made."

Prepyloric lesions occupy the most difficult location. Here the roentgenologist is obliged occasionally to limit his interpretation to "lesion at the outlet." The prepyloric lesion is occasionally hard to differentiate from a duodenal, a gastroduodenal or a pyloric ulcer, especially when obstructive signs are present and the patient has undergone previous operations, commonly cholecystectomy. Scirrhous carcinoma, syphilis, hypertrophy of the pylorus, phytobezoar, lymphoblastoma, leiomyoma, polyps, and many other lesions, singly or in combination, are often indistinguishable. A duodenal ulcer may easily obscure a gastric lesion, especially when obstructive and associated with hypoacidity and achlorhydria.

Gastroscopic Examination.—Varied opinions have been expressed as to the advisability of routine gastroscopic procedures. It is my personal opinion, when comparing roentgenologic with gastroscopic interpretations after a pathologic diagnosis has been established, that the roentgen diagnosis is much more reliable and practical. Gastroscopic examination should be limited to those cases in which, after repeated roentgen studies, there is a questionable or neutral feature that contradicts clinical expectations. Gastroscopic examination should not be routine; it should be used only as a supplementary adjunct when roentgen studies fail, or as an additional confirmatory measure.

Location.—There has been much controversy as to the location and size of the gastric ulcer as an aid in determining its histologic character.

Only 3 ulcers were encountered on the anterior wall outside the pyloric area, and these were near the lesser curvature or on the greater curvature.

There was a uniform distribution of ulcers along the lesser curvature. Sixty-five to 70 per cent of benign gastric ulcers are located about the lesser curvature. Twenty-five per cent of benign gastric ulcers are located in the prepyloric area. Therefore at least 90 per cent of benign gastric ulcers are located in the prepyloric area or that of the lesser curvature.

Sixty per cent of malignant ulcers which are clinically benign are located on the lesser curvature, and 25 per cent in the prepyloric area It is safe to say that at least 90 per cent of ulcers on the greater curvature are malignant and should be treated as such.

On breaking down these statistics, no appreciable change was noted in the percentage of malignant lesions except on the greater curvature

The clinically benign gastric ulcer, in spite of its location proved malignant in 16 per cent of the cases studied

Size —The most reliable criterion for determining malignancy in the ulcer is the size of the ulcer, rather than its location The exact diameter of the ulcer was measured in 380 cases Fifty five per cent of ulcers measuring more than 2 5 cm were benign, and 45 per cent were malignant Ninety five per cent of ulcers measuring less than 2 5 cm were benign and only 5 per cent were malignant This explains why 20 per cent of the prepyloric ulcers were malignant—in this location 36 per cent of the ulcers were greater than 2 5 cm in diameter

Thirty per cent of the clinically benign gastric ulcers were 2 5 cm or greater in diameter

Gross and Microscopic Observations — 1 There is probably a continuous breakdown and repair in the normal stomach as well as in the stomach with a gastric ulcer But in the ulcer area, degeneration and necrosis surpass the repair Acid change—diminution, dilution and neutralization—is the important factor

2 Stomachs with gastric ulcers showed a surrounding inflammatory reaction with infiltration of polymorphs and lymphocytes depending upon the acuteness of the ulcer The edges were elevated and reddened in the acute or active phase, and a crater was produced by the eroded center The important sign in these benign ulcers was the pulling up of the muscularis mucosa to the edge of the ulcer, meeting the muscularis propria If this muscular sign is present and the ulcer shows carcinomatous cells, it is safe to say that the carcinoma originated in a previously benign gastric ulcer

3 Ulcers or eroded areas lying on the surface of primary carcinomas of the stomach showed no pulling up of the muscularis mucosa, and the carcinomatous cells were more uniformly distributed These lesions did not represent malignant change of a previously benign ulcer

4 The so called normal portions of the stomach harboring primary carcinoma showed marked hyperplasia of the mucous cells as described by Judd[44] We agree with him that the pathogenesis of the carcinoma is associated with the disorganized hyperplasia of the mucous cells There was also a decrease in the number of parietal cells

5 Gastric ulcers did not show this preponderance of hyperplasia and formation of goblet cells

6 All lesions of the stomach were associated with gastritis and chronic duodenitis, but these were severe in only a few cases

7 Secondary cytoplasia was seen or mentioned on the pathologic reports after frozen section in less than 10 per cent of cases Here the cytologic nature of a portion of the ulcer is indicative of active regeneration but, because of uniform growth, arrangement, appearance and development it cannot be considered true carcinoma It probably represents an atypical hyperplastic regenerative chang which maintains normal reparative functio Apparently, if the hyperplasia exceeds t differentiation malignancy results

8 Vascularity was not changed in a occupied by the lesions whether the ulc benign or malignant

9 The age of the patient had no ef n the characteristics of the gastric muc

Grading and Classification —Nin per cent of the patients had grade II a nci noma, 39 per cent, grade III aden noma and 42 per cent, grade IV ade noma Twenty five per cent of the lesi re type A, 34 per cent, type B, and 41 p t type C

The gastric carcinomas in t ies were high grade lesions, 61 per cen g of either Grade III or Grade IV It w ind that the higher the grade the higher e percentage of nodal involvement The s the lesion *had* no significant relation to de or *type of* involvement Grant[45] ol ed in *studying* mucous carcinomas of t tomach *that* '*the* larger the lesion the hig the grade *Lesions* on the greater curvat and *posterior wall* tended to be of highe rades with *more nodal* involvement

Two specimens owed two *separate* ca nomas One patient had a *Grade III* carcinoma, Type A, in the *prepylori* a Grade II adenocarcinoma, Type C, on the lesser curvature. The other patient had a grade II adenocarcinoma, Type A, on the posterior wall and a Grade IV, adenocarcinoma, Type B, on the greater curvature. In this series of 400 cases the aforementioned double carcinomas would make an incidence of 3 per cent of multiple carcinomas for carcinoma of the stomach, which resembles, clinically, a benign gastric ulcer. In gross carcinomas of the stomach, when different grades are observed in the same lesion, it may be that the lesions originated as two separate carcinomas, one grade completely overshadowing and overgrowing the other. This, however, is only a personal theory.

· There was one benign gastric ulcer on the greater curvature.

Operation.—In the 400 consecutive cases here there were 5 deaths (1.2 per cent): 2 following partial gastrectomy (posterior Polya) for benign gastric ulcer; 2 following total gastrectomy for carcinoma, and 1 following total gastrectomy for benign gastric ulcer.

The mortality for a benign gastric ulcer after partial gastrectomy was less than 0.7 per cent.

Surgical intervention in these cases consisted of a wide variation of procedures, depending upon the results of laparotomy, but it consisted almost exclusively of some type of partial gastrectomy.

Eighty per cent of the procedures were of the posterior Polya type. The others, in the order named, were (*a*) anterior Polya, with or without a Balfour entercenterostomy; (*b*) Billroth I; (*c*) knife excision and posterior gastroenterostomy; (*d*) total gastrectomy, and (*e*) pyloroplasty (1 case).

Sixteen patients had previously undergone unsuccessful gastric operations; 12 had undergone posterior gastroenterostomies from six months to twenty-six years previously. One had undergone a Billroth I subtotal gastrectomy six years before. One had been operated on for an acute perforating gastric ulcer, and 1 had had pyloraplasty and gastroenterestomy twelve years earlier and a partial gastrectomy (anterior Polya-Balfour) seven years earlier. One patient had undergone posterior gastroenterostomy for duodenal ulcer two years before and a disconnection of the gastroenterostomy, knife excision of a gastric ulcer and a Billroth I operation eight months previously.

The operations performed on these 16 patients were as follows:

Partial gastrectomy, posterior Polya with disconnection of the gastroenterostomy, 8
Partial gastrectomy, anterior Polya with disconnection of the gastroenterostomy, 3
Partial gastrectomy, posterior Polya with disconnection of the gastroenterostomy and cholecystectomy, 1
Partial gastrectomy, anterior Polya, disconnection of gastroenterostomy and choledochoduodenostomy, 1
Knife excision, 1
Partial gastrectomy, posterior Polya with disconnection of the gastroenterostomy and closure of colic fistula, 1
Partial gastrectomy, posterior Polya, 1

The type of lesion in these 16 cases was as follows:

Stomal ulcer, 5 cases
Stomal ulcer plus gastric ulcer, 2 cases
Gastric ulcer, 4 cases
Gastric ulcer plus duodenal ulcer, 1 case
Grade III adenocarcinomatous ulcer, Type B, 1 case
Edematous malfunctioning anastomoses, 1 case

Miscellaneous Data.—1. In 13 cases there were multiple gastric ulcers about the lesser curvature, plus a duodenal ulcer.

2. Five of the malignant ulcers on the lesser curvature were associated with a duodenal ulcer.

3. Three of the malignant ulcers in the prepyloric area were associated with a duodenal ulcer. (Fischer[16] observed that only 0.1 per cent of patients with duodenal ulcer had an associated gastric malignant lesion.)

4. Fifty-eight of the single gastric ulcers were associated with duodenal ulcer. It was impossible to get histologic tissue from the duodenal ulcer in all cases, but we considered a duodenal ulcer present when one was reported by the roentgenologist or described by the surgeon. Some of the patients gave a typical duodenal ulcer history.

5. Thirty-three patients had multiple gas-

tric ulcers When multiple gastric ulcers were present they were usually small and very rarely associated with malignancy

Although not included in the statistics the clinical history of gastric ulcer was suggestive in the following cases observed in 1942 and 1943

6 No grossly specific ulcer was demonstrable in 4 cases but pathologically 2 patients had a severe ulcerative type of gastritis and 2 others showed nonspecific chronic gastritis with great thickening of the rugae

7 In 3 cases there was continuous gastroduodenal ulcer

8 In 4 cases there were areas of polypoidosis with superficial ulceration, interpreted by the roentgenologist as possible hypertrophic gastritis due to lymphoblastoma

9 In 14 cases there were polyps of the stomach, Rhorer[4] observed that 53 2 per cent of adenomatous gastric polyps have a marked tendency to become malignant but in cases of polypoidosis malignancy is rare Rienets[45] observed malignant change in 37 2 per cent of gastric adenomas

10 Four phytobezoars were associated with gastric ulceration The clinical history in these cases was similar to that of gastric ulcer The lesion was identified by roentgen study

11 There were 10 cases of leiomyoma in 3 of which the lesion was associated with carcinoma of the stomach Commonly an ulcer was present on the mucosal surface Rienets[45] observed that leiomyoma of the stomach in his series was most commonly present but rarely gave rise to clinical symptoms He pointed out that this lesion should not be confused with carcinomatous metastases and that the high incidence of ulceration and degeneration may require surgical intervention

COMMENT

Eusterman has discussed and I have observed young men in whom a benign ulcer was suspected and carefully watched, with frequent roentgenograms of the stomach and in whom the ulcer completely disappeared and left the patient asymptomatic Under such circumstances the patient returns in one to three months with recurrent symptoms and a demonstrable gastric ulcer in exactly the same location, an ulcer which, after gastric resection proves malignant This argues against the advisability of classifying a gastric ulcer as benign even on the basis of spontaneous disappearance, therapeutic, clinical and roentgenologic According to Eusterman,[49] the significant combination of circumstances that favors malignancy is that of recent onset, advanced age, a lowered acid titer (especially to the extent of achlorhydria) and pyloric obstruction He has expressed the hope that a specific biologic test may be devised, such as those used for pregnancy, syphilis tuberculosis lymphogranuloma venereum hydatid disease and trichinosis which would indicate positively the nature of the lesion[5]

Melena is both a valuable diagnostic index and a means of evaluation of the response to treatment

It has been pointed out by Eusterman and Morlock[51] that a few silent gastrointestinal hemorrhages take their origin from ulcers of the stomach

Systematic examination of the feces is a good routine procedure and is excelled in importance only by the roentgen ray in the diagnosis of gastric lesions especially carcinoma After two or three weeks of medical treatment for gastric ulcer, the persistence of occult blood in the stool necessitates further tests with an eye to the possibility of gastric carcinoma The absence of occult blood is strongly suggestive of the benign nature of the lesion but one must always keep in mind the possibility of the resurfacing of a malignant ulcer

Rivers and Wilbur[7] studied 668 cases of hematemesis, in 91 per cent of which the condition was due to intrinsic gastroduodenal lesions Gastric ulcer comprises 7 1 per cent of all causes of hematemesis Malignant lesions of the stomach were responsible for 12 6 per cent of the hematemeses in this study, and it is well to remember that most of the lesions were diagnosed clinically Clinically diagnosable carcinomas of the stomach bleed four times as often as do malignant ulcers of the stomach simulating benign ulcers

Hematemesis in itself must not be interpreted as diagnostic of an intrinsic gastrointestinal lesion for varices of the esophagus and the stomach, as well as blood dyscrasias may be the cause

As Priestley[10] pointed out, it should be remembered that in only 50 per cent of cases is gastric carcinoma associated with achlorhydria. Judd and Priestley[52] showed that approximately 1 of 5 patients treated gastric resection for carcinoma of the stomach had normal or elevated gastric acid levels.

Gray[53] emphasized the fact that benign lesions may be associated with low acidity or none, while malignant lesions may be associated with relatively high degrees of acidity. Comfort, Butsch and Eusterman[54] have shown that depression of gastric acidity in patients destined to the development of carcinoma of the stomach is a progressive and selective process, appearing early in life and at any age, and that a further reduction of gastric acidity occurs after the carcinoma develops. In their opinion, deficiency in the secretion of free hydrochloric acid, rather than its neutralization, is responsible. Eusterman has pointed out that gastritis associated with a lesion of the stomach is an important factor in depressing the secretions, as well as a possible precursor of carcinoma.

Dragstedt,[55] by means of vagotomies (both subdiaphragmatic and transthoracic) has produced marked reduction in gastric acidity, with disappearance of the ulcer and clinical relief. Striking results have been obtained with duodenal, gastric and jejunal ulcers. Vagotomy is contraindicated for gastric ulcer. because of the possibility that the ulcer is malignant. In selected cases vagotomy is advisable for duodenal ulcer, occasionally in combination with gastroenterostomy for obstructive symptoms, and it is most useful for patients with gastrojejunal ulcer who have undergone a previous gastric resection. In dogs, section of the vagi produces, in four to six years, hypertrophy of the pyloric muscle, accompanied occasionally with obstructive signs. Whether this will occur in man remains to be seen.

Important facts to remember concerning postoperative gastric acidity are: (*1*) complete removal of the pylorus and antrum to abolish the chemical phase, (*2*) the amount of fundic secretory tissue removed (extent of resection), (*3*) duodenojejunal regurgitation along with food maintains dilution and neutralization, (*4*) vagal irritability (cephalic stimulations) and (*5*) the amount of gastritis present.

In 79 of the cases studied a duodenal ulcer accompanied the gastric lesion, and in 46 there were one or more gastric ulcers. In both groups there was a definite tendency toward high levels of gastric acidity.

There was also a tendency toward a low acid level with ulcers definitely located on the posterior wall. And, because of the high percentage of malignant lesions associated with ulcers of the greater curvature, there was, as one would expect, a tendency toward lower acidity.

With these criteria in mind, and recognizing the importance of warning the patient, Eusterman[49] stated that 26 per cent of gastric lesions interpreted by the roentgenologist as possibly malignant actually were benign. In the same series, 7 per cent of lesions unequivocally diagnosed as benign were actually malignant. A duodenal ulcer is practically never malignant, whereas a prepyloric ulcer may easily be so. If the clinical history is suggestive of a gastric lesion and a roentgenogram of the stomach is reported as showing duodenal ulcer, it is wise to recheck, for the next examination may reveal a gastric carcinoma. A glance at the statistics is enough to reveal the difficulty of diagnosing prepyloric lesions. The same difficulty arises, though not so frequently, with lesions in other parts of the stomach. Roentgen studies may repeatedly miss a lesion at the cardia, especially if it is accompanied with a diaphragmatic hernia.

If medical treatment is preferred by the patient and the ulcer is carefully watched by repeated roentgen examinations, a false impression of healed or healing benign ulcer may prevent recognition of a carcinomatous ulcer filling up with carcinomatous cells or granulation tissue. Here again it is impossible to make sure, on the basis of roentgen studies, which is actually the case.

Eusterman[56] has enlarged upon the possibilities of the gastroscope in capable hands, expressing the opinion that gastroscopic examination should be done in all cases of dyspepsia after roentgen examinations fail to reveal the expected lesion. In many cases, gastritis has been correctly diagnosed and treated after gastroscopic study.

These interpretations necessarily depend on the capability of the gastroscopist, just as roentgenologic interpretations depend on the roentgenologist

Allen[4] has said that 65 per cent of gastric ulcers in the immediate area 2 cm from the pyloric ring are malignant Wiley[5] said that 83 per cent in the prepyloric area are malignant Such high percentages must surely include carcinomas which are clinically diagnosable and have ulcerating surfaces In the series of Kirklin and MacCarty only 11 3 per cent of prepyloric ulcers proved malignant after all tumefactions had been excluded Blum[8] reported a case of benign ulcer on the greater curvature and was able to find only 15 additional proved cases in the literature but probably many more such lesions have been observed, diagnosed and treated

It is not hard to choose between surgical intervention, with its low mortality, lack of recurrences and relief of symptoms, and medical treatment, with its high percentage of malignancy and recurrence Table 4 (from Judd and Priestley[7]) shows the inadequacy of medical treatment

SUMMARY AND CONCLUSIONS

Of 400 thoroughly studied cases of clinically benign gastric ulcer carcinoma was present in 16 per cent

Forty five per cent of ulcers 2 5 cm or more in diameter were malignant whereas only 5 per cent of ulcers under this size were so Thirty per cent of clinically benign gastric ulcers were 2 5 cm or more in diameter

No great alteration in the percentage of malignant lesions was noted in respect to location except that of the prepyloric lesions 20 per cent were malignant But 36 per cent of the ulcers in this location were 2 5 cm or more in diameter At least 90 per cent of ulcers on the greater curvature are malignant but here again the size of the ulcers tends to be larger

A thorough history including all symptoms and the results of all laboratory procedures does not differentiate benign from malignant ulcers

Sixty five to 70 per cent of benign gastric ulcers are located about the lesser curvature 25 per cent in the prepyloric area Therefore at least 90 per cent of benign gastric ulcers are either in the prepyloric area or in the region of the lesser curvature

Sixty per cent of clinically benign gastric ulcers which proved malignant on histologic study were located in the area of the lesser curvature, 25 per cent in the prepyloric area

Eighty one per cent of the carcinomas were either of Grade III or of Grade IV, and 40 per cent showed localized nodal involvement

The surgical mortality was slightly greater than 1 per cent In only 1 case was the lesion inoperable

The possibility of malignant change and the favorable results following partial gastrectomy make this the treatment of choice

RÉSUMÉ

Sur 400 cas d'ulceres gastriques bénins etudies a fond le carcinome fut present dans 16%

45% des ulceres d'un diametre de 2 5 Cm ou plus furent malins, tandis que 5% des ulceres ayant un diametre de moins de 2 5 Cm furent malins 30% d'ulceres gastriques cliniquement benins furent d'un diametre de 2 5 Cm ou plus

Il n'y eut aucune alteration dans le pourcentage des cas malins en rapport avec les locations des lésions excepte que dans les lésions prepyloriques 20% furent malins, mais 36% des ulceres de 2 5 Cm ou plus en diametre furent prépyloriques, aussi 90% au moins des ulceres de la grande courbature etaient malins mais aussi avaient une tendance a être plus grands

Une étude des symptômes et les procédures de laboratoire ne peuvent pas differencier avec certitude les ulceres gastriques benins des ulceres malins

65 a 70% des ulceres gastriques benins sont situés sur la petite courbure, 35% dans la région prépylorique Aussi au moins 90% des ulceres gastriques benins sont situes ou dans la region prepylorique ou autour de la petite courbure

60% des ulceres gastriques chroniques diagnostiqués chroniques qui cliniquement benins etaient histologiquement malins étaient situes de long de la petite courbure

25% des ulceres gastriques cliniquement bénins etaient histologiquement malins et etaient situes dans la région prépylorique

81% des carcinomes étaient ou de la serie III

ou de la serie IV, et 40% montraient des lesions nodales.

Ces malades ont une meilleur pronostic que les malades qui etaient cliniquement diagnosables carcinome de l'intestin.

La mortalité chirurgicale était à peu près 1% plus grande. Seulement dans un cas, fut la lesion inopérable.

La possibilité de changement malin, les resultats favorables consecutifs à une gastrectomie partielle fait de cela la traitement de choix.

RESUMEN Y CONCLUSIONES

Se encontró la presencia de carcinoma en el 16% de 400 casos estudiados de úlcera gástrica clínicamente benigna.

El 45% de las úlceras de 2.5 cm. o más de diámetro resultaron malignas, en tanto que solamente el 5% de úlceras con diámetro inferior a 2.5 cm. resultaron malignas. El 30% de las úlceras gástricas clínicamente benignas fué de 2.5 cm. o más de diámetro.

No se notó gran alteración en el porcentaje de malignidad respecto a la localización de la lesión, con excepción de las lesiones prepilóricas que resultaron 20% malignas, pero el 36% de las úlceras fueron particularmente de 2.5 cm. o más de diámetro. Asimismo, cuando menos el 90% de las úlceras de la gran curvatura fueron malignas, pero también estas tendieron a ser mayores.

Una historia completa, incluyendo todos los síntomas y procedimientos de laboratorio, no logra diferenciar las úlceras benignas de las malignas.

Del 65% al 70% de las úlceras benignas se localizan en la pequeña curvatura, 25% en el área prepilórica. En consecuencia, cuando menos el 90% de las úlceras gástricas benignas se encuentran en el área prepilórica o en la pequeña curvatura.

El 60% de las úlceras gástricas clínicamente benignas que resultaron histológicamente malignas fueron de la pequeña curvatura.

El 25% de las úlceras gástricas clínicamente benignas que resultaron histológicamente malignas fueron del área prepilórica.

El 81% de los carcinomas fueron del grado III o del grado IV, habiendo presentado metástasis ganglionares el 40%.

Estos pacientes tuvieron pronóstico mucho mejor que aquellos en quienes se diagnosticó clínicamente carcinoma gástrico.

La mortalidad quirúrgica fué ligeramente mayor del 1%. Solamente en 1 caso fué inoperable la lesión.

La posibilidad de mutación maligna y los resultados favorables que siguen a la gastrectomía parcial hacen que esta sea el tratamiento de elección.

RIASSUNTO

Sopra 400 casi di ulceri clinicamente benigne dello stomaco l'A. ha registrato una percentuale del 16% di carcinomi.

La percentuale e' salita al 45% nelle ulceri aventi un diametro minimo di cm. 2,5: e' scesa al 5% nelle ulceri al di sotto di questo diametro. Il 35% delle ulceri clinicamente benigne aveva un diametro superiore a cm. 2,5.

La percentuale di malignita' non varia invece molto in rapporto alla sede della lesione. Solamente nelle lesioni prepiloriche la percentuale dei cancri e' stata del 20%: ma nel 36% le ulceri superavano i 2,5 cm. di diametro. La stessa eccezione si puo' fare per le ulceri della grande curvatura, le quali raggiungono bensì una percentuale di malignita' del 90%, ma sono quasi sempre molto estese.

Una diagnosi differenziale sicura fra ulceri benigne e maligne non e' possibile, pure includendo tutti i sintomi e tutti i dati di laboratorio.

Nel 65-70% dei casi le ulceri benigne sono situate nella piccola curvatura: nel 25% nella regione prepilorica. Si puo' quindi concludere che nel 90%, per lo meno, dei casi le ulceri colpiscono o la regione prepilorica o la piccola curvatura dello stomaco.

Nel 65% delle ulceri clinicamente benigne, ma istologicamente maligne, la sede era a livello della piccola curvatura.

La percentuale e' scesa al 25% quando le ulceri istologicamente maligne erano situate nella regione prepilorica.

Nell' 81% dei carcinomi la fase di sviluppo corrispondeva al grado III o al grado IV: nel 40% esisteva gia' una diffusione alle linfoghiandole locali.

La prognosi e' tuttavia molto migliore di quella dei pazienti affetti da un carcinoma diagnosticabile clinicamente.

Solamente in un caso esisteva un'assoluta inoperabilita' La percentuale della mortalita' operatoria e' stata lievemente superiore all 1%

I risultati favorevoli della gastrectomia parziale nelle ulceri potenzialmente maligne rendono quest'intervento la cura di elezione per le ulceri dello stomaco

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Unter vierhundert sorgfaeltig untersuchten Faellen von klinisch gutartigen Magengeschwueren stellte sich ein Karzinom in sechzehn Prozent heraus

Fuenfundvierzig Prozent der Geschwuere die einen Durchmesser von 2,5 cm oder mehr zeigten, waren boesartig waehrend unter denen, die kleiner als 2 5 cm waren nur fuenf Prozent maligne waren Dreissig Prozent der klinisch gutartigen Geschwuere hatten einen Durchmesser von 2,5 oder mehr cm

Im Hinblick auf den Sitz des Geschwueres konnten keine grossen Veraenderungen des Prozentsatzes der Boesartigkeit beobachtet werden, abgesehen davon dass von den praepylorischen Geschwueren zwanzig Prozent boesartig waren, hier aber waren sechsunddreissig Prozent der Veraenderungen groesser als 2 5 cm im Durchmesser, ausserdem sind mindestens neunzig Prozent der Geschwuere an der grossen Kurvatur boesartig aber auch hier besteht eine Neigung zur Bildung von Geschwueren groesseren Formats

Es ist nicht moeglich durch sorgfaeltige Anamnese einschliesslich aller Symptome und Laboratoriumsuntersuchungen gutartige von boesartigen Geschwueren zu unterscheiden

Fuenfundsechzig bis siebzig Prozent der gutartigen Magengeschwuere liegen im Bereich der kleinen Kurvatur, fuenfundzwanzig Prozent in der praepylorischen Gegend das heisst neunzig Prozent der gutartigen Magengeschwuere sind entweder in der praepylorischen Gegend oder an der kleinen Kurvatur zu finden

Sechzig Prozent der Geschwuere die sich histologisch als boesartig erwiesen sassen in der Gegend der kleinen Kurvatur Fuenfundzwanzig Prozent der klinisch gutartigen Geschwuere die histologisch als boesartig nachgewiesen wurden sassen in der praepylorischen Gegend Einundachzig Prozent der Krebse waren entweder dritten oder vierten Grades und vierzig Prozent zeigten ein Befallensein der oertlichen Lymphdruesen

Diese Kranken geniessen eine viel bessere Prognose als die die ein klinisch erkennbares Magenkarzinom haben

Die chirurgische Sterblichkeitsziffer war etwas hoeher als ein Prozent Nur in einem Falle war die Erkrankung inoperabel Die Moeglichkeit, boesartige Veraenderungen zu beseitigen und die erzielten guenstigen Ergebnisse machen die partielle Magenresektion zur Behandlung der Wahl

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Echoes of the Past

IV "Dr Livingstone, I Presume"

Into the humble home of a storekeeper of Lanarkshire, Scotland, was born the famous explorer and geographer David Livingstone (1813 1873) At the age of ten he began to work as a splicer in a cotton mill He studied at night after many hours of toil Young David prepared himself for the university when he was twenty three He attended the medical and Greek classes in Anderson's College Glasgow In 1837 he was an acceptable candidate for the London Missionary Society Under the auspices of this society he pursued his medical studies at the College of Physicians and Surgeons in Glasgow and after his graduation he sailed for South Africa (1840)

As a medical missionary David Livingstone arrived in Africa and went one hundred miles inland to Kuruman During the next eleven years he was separated from all white men He lived among the natives, learning their language, life and laws

Dr Livingstone penetrated farther north than any white man had ever gone before His observations of the flora and fauna of Central Africa resulted in contributions that enriched the world's knowledge of botany and zoology

A tireless explorer Livingstone set himself the task of finding a route to the interior of Africa from either the east or the west coast He started on this exploration in November 1853, but the trip was unsuccessful, he fell ill of dysentery His studies of the African rivers, however led him to many conclusions which subsequent explorers confirmed He turned his attention eastward and followed the Zambesi to the Indian Ocean

In the fall of 1869 the civilized world awoke to the fact that no news of Livingstone had been forthcoming He was believed lost in the heart of Africa

Henry M Stanley of the New York Herald was sent to find the explorer The search took two full years but succeeded at last and the story of the two men's meeting is famous Livingstone was living under great hardships and on the verge of despair but could not be persuaded to return Livingstone continued his explorations of the rivers Nile Congo and Zambesi until his death, which occurred one year later

T Kitchen in *Southern Medicine and Surgery*, October 1939 has given us a graphic description of Livingstone s death 'On the first day of May, 1873, his trusted servant found him beside his couch in the attitude of prayer his head in his hands, dead His faithful followers removed his heart and other viscera and buried them in a tin box under the tree beneath which he had died His body which had been reduced by fever to little more than skin and bones was then dried in the sun for fourteen days With unfailing devotion, his black men carried his body a thousand miles to the coast whence it was returned to England " So ended the career of a man of medicine who is rememberd chiefly for accomplishments outside his profession

—Bernard J Ficarra M D F I C S

Endoscopic Intrathoracic Exeresis of the Great Splanchnic Nerve for Gastroduodenal Ulcer

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THE current conception of appropriate surgical therapy for gastroduodenal ulcer is about to undergo a complete revolution. The classic operation, resection of the ulcer—since Billroth the pride of modern surgery—is about to yield place to a neurovegetative functional conception of the therapy of this disease, which is constantly increasing.

Bircher was first to recognize the neurofunctional factors in the treatment of gastrointestinal ulcer. The surgical conception based on gastric innervation had previously been too vague and theoretical to have practical importance.

Since then the neurovegetative aspect of both the genesis and the therapy of ulcers has been examined much more precisely. Two groups of nerves—the vagus and the sympathetic—are distinguished, which, although apparently antagonistic, may play a responsible role in both the formation and the therapy of ulcer.

The real merit of Dragstedt's work consists in the fact that he gave impetus to the new conception by resection of the vagus nerves. The initial enthusiasm aroused by this soon met with strong criticism. Dragstedt then modified his method. The gastric atony brought about by elimination of the vagus nerves resulted, in a high percentage of cases, in more or less violent reactions, such as persistent vomiting, diarrhea, and, in consequence, dangerous nutritional disturbance. This is why Dragstedt, in later years, supplemented the vagotomy with a gastroenterostomy; in other words, an involuntary return was made to a type of gastric operation which had already been condemned. The operation remains a major procedure, even though the results of the Dragstedt technic, based upon lowered hypermotility and hypersecretion of acid gastric juice, are undoubtedly favorable.

Splanchnicectomy, the procedure of Nicolas Pende, by any of its various technics is a major operation which is not without risks and possible complications.

Splanchnicectomy as carried out by Fröhlich, Stephen and Fröhlich (the Strassburg group) is a mediastinal-lumbar intervention that seems technically out of proportion to the removal of such a tiny nerve filament, even though the clinical results are favorable. Fröhlich's interpretation of his successes from the *endocrinosympathetic* point of view is vague and inadequately substantiated. However, the clinically favorable results of splanchnicectomy naturally led to the desire to reach the nerve without blood effusion, by a simple puncture, and to put it out of function by anesthesia for indeterminate period. Admittedly the method is a simple one, but the topographic nature of the sympathetic nerves is such as to make a random search for them uncertain and inadequate. On the other hand, the *endoscopic transpleural* route for locating the pectoral sympathetic nerve, recently recommended by Kux, is advantageous to such an extent that, on the basis of his first short communication, I found it possible to make immediate use of this technic, which is relatively simple and safe.

At that time I did not have precise knowledge of the Kux technic, but I was aware of its general principles. In any case, the explanation given by Kux was so comprehensive and simple as to make it easily possible for me to develop the following method: application of a small pneumothorax, followed by a control roentgenogram to ascertain that the leaves of the pleura were free. This was followed by introduction of a thoracoscope (by means of a trocar, with the region under local anesthesia) into the medial anterior axillary line. It is recommended that the endoscopic procedure be performed in a dark room. A little practice and adaptation will soon enable one to observe, in the thoracic posterior cavity, the sympathetic nerve in its entire course, and also the ramification of the two splanchnic nerves.

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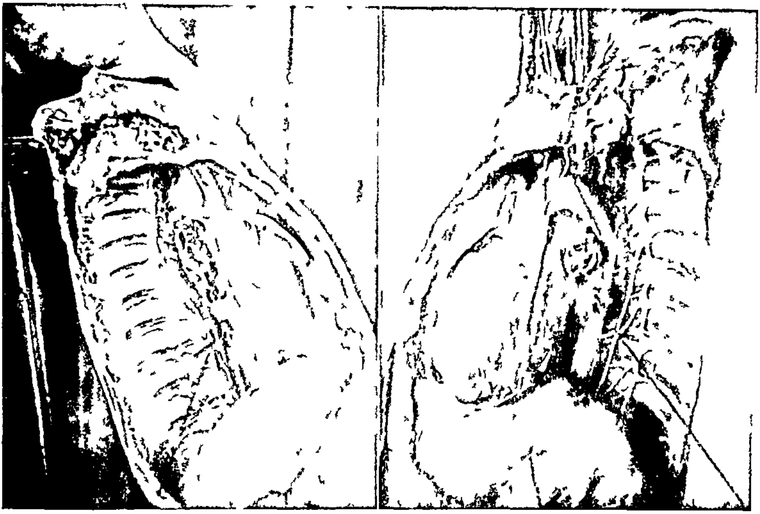

Left anatomic location of right splanchnic nerve *right* that of left splanchnic nerve The arrows indicate the exact points of interest

One is surprised to observe here that the splanchnic sympathetic nerve shines plastically through the parietal pleura I found it extremely useful to have a few different preparations made of this nerve* with a view to accustoming the eye to the rich variability of the nervous trunk and also to familiarize myself with the plastic appearance of the nerve (see illustration)

After a certain amount of practice it is not difficult as a rule to locate the nerve at first by direct vision and subsequently by vision at an angle of 90 to 130 degrees At first I employed a celioscope (Gullbring) subsequently I used a Kremer apparatus as modified by Jacobaeus The appropriate instrument is introduced through a second aperture of the trocar in order to excoriate the pleura parietalis with a view to extracting the splanchnic nerve at the selected site and coiling it up subsequently onto a simple spoke of a bicycle wheel Hitherto I considered it necessary not to be satisfied with simple separation by means of cauterization but to perform an exeresis taking the anastomoses into account It is possible in this manner to remove from 3 to 5 cm of the nerve

For beginners in this method there are two important factors in exeresis In the first place the patient shows signs of violent characteristic pain in the epigastric region right or left as the case may be and in the second place the segment of nerve extracted makes possible a histologic control A twofold guarantee is thus obtained to prove that the nerve aimed at has been extracted

I have encountered no real complications in any of my exereses The only complications observed in a few cases were temporary meteorism and retention of urine As a rule these symptoms disappeared within twenty four *hours after the usual medical treatment*

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*I am indebted to Prof B [illegible] of King Fouad University Cairo who suggested the preparations

My patients with ulcer showed the various groups of typical ulcer symptoms. Among them were some who had violent and repeated hemorrhages; others had attacks of vomiting seven or eight times a day, and in some the ulcers had perforated. As a rule I operated on the last-mentioned patients three to four weeks after the perforation had been sutured, while other patients were suffering from hematemesis and chronic melena, many of them requiring a blood transfusion.

All these symptoms, pain in particular, ceased as soon as the splanchnic nerves had been interrupted, and none of the patients suffered from vomiting after the operation. All of the operative patients regained the weight they had lost in the course of the disease; 1 patient regained 9 Kg. in one year.

What chiefly impressed all the patients, however, was the *total disappearance* of pain. I observed that exeresis of the *right* great splanchnic nerve alone would insure the healing of duodenal ulcers and of pyloric, prepyloric and postpyloric ulcers.

Exeresis of the *left* great splanchnic nerve resulted in the cure of the stomach ulcer proper.

Attention is drawn to the fact that all the patients, who for many years had anxiously endeavored to avoid any dietetic errors, were able after the operation to eat normally, and at the time of writing they continue to do so with impunity (period of observation, fifteen months). A curious case was that of an inveterate drunkard who had been hospitalized and operated on for a perforating ulcer; since then he has been able to drink happily and without concern!

Six weeks *after the operation* the ulcer cavities of all the patients operated upon had become invisible under the roentgen rays.

In my opinion, the fear that elimination of the sympathetics may result in painless perforation of the ulcer is not founded on physiologic fact; a sufficient number of sympathetic fibers exist in the vagus itself, particularly in the vessels of the stomach, which otherwise would react alarmingly.

How can one interpret the course of recovery as a result of splanchnicectomy? The consensus is that the relation between the vagus and the sympathetic nerves is explained simply by the fact that two influences, antagonistic in appearance only, enter into collision, and that the elimination of one of these nerves results in the subtraction of its functions (Hess).

Taking into account the complicated mechanism of innervation (it is well known that the vagus nerve contains sympathetic fibers [Shapiro and Robillard] and the fact that physiologists [Rasmussen and Duncan] have been able to demonstrate that the splanchnic nerve contains vagus fibers (myelinic), I have assumed that these two systems, although they appear to antagonize each other, not only cross each other anatomically but are physiologically functional alternates. By the elimination (eventually only temporary) of one of these groups, the deranged equilibrium is restored and a functional optimum is obtained. Probably overstimulation of the emotional and sensitive sympathetic nerve provokes secondary irritation of the vagus. Splanchnicectomy eliminates pain and thus cancels the irritating impulses toward the neuromotorsecretory system of the vagus.

SUMMARY

The author presents his own method of endothoracoscopic intrathoracic removal of the main splanchnic nerve. He has found this method effective in the healing of gastroduodenal ulcer. Removal of the right main splanchnic nerve alone is sufficient to insure healing of gastroduodenal pyloric, prepyloric or postpyloric ulcer. Removal of the main left splanchnic nerve results in healing of the peptic ulcer proper. The operation is performed with local anesthesia, by means of a thoracoscope and a preliminary pneumothorax. It is practically bloodless.

The healing process can be explained by removal of the overexcited emotional and sensitive splanchnic nerve, which, in its turn, excites secondarily the secretomotor system of the vagus nerve. This causes elimination of the ulcer pains, and the irritating impulses are removed. A physiologic equilibrium is thus obtained between the two nerves, which are antagonistic in appearance only, and as a consequence optimal function is obtained.

Although the method has been in use for a comparatively short time, no relapses have

been observed at the time of writing some fifteen months after operation All patients concerned will be followed up

RÉSUMÉ

Nous avons développé une methode d'exerese du nerf grand splanchnique par la voie endothoracoscopique Elle semble aboutir a la guérison des ulceres gastro duodenaux Nous avons observé, que l'exérese du nerf grand splanchnique droit suffirait a elle seule pour assurer la guérison de l'ulcere duodenal et de l'ulcère pylorique et pre et post pylorique L'exérese du nerf grand splanchnique gauche aboutirait à la guérison de l'ulcere de l'estomac proprement dit

ZUSAMMENFASSUNG

Der Verfasser stellt seine eigene Methode der endothorakoskopischen intrathorakalen Entfernung des grossen Splanchnikusnerven dar Er hat gefunden dass seine Methode in der Heilung von Magen und Zwoelffingerdarmgeschwueren wirksam ist Die Entfernung des rechten Hauptastes des Splanchnikus allein genuegt, um die Heilung von pylorischen, praepylorischen und postpylorischen Geschwueren zu sichern Die Entfernung des linken Splanchnikusnerven fuehrt zur Heilung des eigentlichen typischen Magengeschwuers Die Operation wird mit Hilfe eines Thorakoskops und eines einleitenden Pneumothorax in Lokalanaesthesia ausgefuehrt und ist praktisch unblutig

Der Heilungsprozess kann durch die Entfernung des uebererregten Gefuehls und Empfindungsnerven, des Splanchnikus, der seinerseits widerum das sekretomotorische Vagussystem erregt, erklaert werden Dies verursacht das Verschwinden der Geschwuersschmerzen, und damit werden die reizenden Impulse ausgeschaltet Auf diese Weise wird zwischen den beiden Nerven die nur dem Anschein nach Antagonisten sind ein physiologisches Gleichgewicht hergestellt und eine optimale Funktion ist die Folge

In der allerdings verhaeltnismaessig kurzen Zeit der Anwendung der Methode sind bis zur Zeit der Veroeffentlichung keine Rueckfaelle innerhalb von vierzehn Monaten nach der Operation gesehen worden Die Beobachtung aller Kranken wird fortgesetzt werden

RIASSUNTO

Abbiamo messo a punto, un metodo d'exeresi del nervo grande splacnico per la via endotoracoscopica Sembra che si possa, in questo modo avere ragione delle ulceri gastro duodenali Abbiamo osservato che l'exeresi del nervo grande splacnico di destra, era sufficiente per assicurare la guarigione dell'ulcera duodenale di quella pilorica ed infine delle ulceri pre, e post piloriche L'exeresi del nervo grande splacnico di sinistra darebbe la guarigione dell ulcera dello stomaco propriamente detta

L'intervento viene eseguito sotto anestesia locale practicamente con scarsa perdita ematica e per mezzo di un toracoscopio, che si fa precedere da un pneumotorace

La guarigione puo spiegarsi in questo modo l'exeresi del nervo splacnico sovra eccitato, destinato alla percezione delle sensazioni emotive e sensitive a sua volta stimolerebbe il sistema secreto motore del nervo vago I dolori esistenti nell'ulcera sarebbero così eliminati, per neutralizzazione degli impulsi irritanti

Si ottiene in questo modo un equilibrio fisiologico tra i due sistemi nervosi che sono antagonisti soltanto apparentemente, e si raggiunge così un ottimo funzionale

Nonostante la brevita del tempo di osservazione (14 mesi soltanto) non abbiamo nei nostri pazienti osservato alcune recidive Ci riserviamo il controllo ulteriore

RESUMEN

El autor presenta su propio metodo de extirpación intratoraxica endotoracoscópica del nervio gran esplacnico Ha encontrado efectivo este metodo en la curación de la úlcera gastroduodenal La extirpación del nervio gran esplacnico derecho es suficiente para segurar la curación de la ulcera gastroduodenal pilórica, prepilórica y postpilórica La extirpación del nervio gran esplacnico izquierdo produce la curación de la propia úlcera péptica La operación se efectúa con anestesia local con un toracoscopio y pneumotórax preliminar Es practicamente incruenta

El proceso de curacion puede explicarse por la extirpacion del superexcitado emocional y sensitivo nervio esplacnico que a su vez excita secundariamente el sistema secretomotor del nervio vago Esto elimina los dolores de la

úlcera y suprime los impulsos de la irritación. Se obtiene entonces un equilibrio fisiológico entre los dos nervios antagonistas en apariencia solamente, obteniéndose por consiguiente una función óptima.

Aunque el método ha sido usado por un tiempo comparativamente corto, no se han observado recaídas hasta el momento de escribir el artículo, catorce meses aproximadamente después de la operación. Se continuará observando a todos los pacientes.

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Author's Note: The special instrument employed is manufactured by M. Schaener U. G., Berne, Switzerland.

Prescriptions of the Eighteenth Century

To cure a pimpled Face. and fweeten the Blood: Take jena, one ounce; put it in a fmall ftone pot. and pour a quart or more of boiling water in it; then put as many prunes as you can get in, cover it with paper and fet it in the oven with houfehold bread; and take of this every day. one, two, three or more of the prunes and liquor. according as it operates; continue this at leaft half a year.

For corns on the Feet: Take the yeaft of beer, and fpread it on a linen rag. and apply it to the part affected: renew it once a day for three or four weeks; it will cure.

To take off Freckles: Take bean flower-water, or elder flower-water or May dew. gathered from corn, of either. the quantity of four fpoonfuls, and add to it one fpoonful of oil of tartar; mix it well together. and often wafh the face with it. and let it dry on.

To take out Spots of the Small Pox: Take half an ounce of the oil of tartar. and as much oil of bitter almonds: mix them together, and with a fine rag apply it often to the face and hands, before the air penetrates into the fkin.

To cure a Cough inclining to a Confumption: Take balfam of fulphur, one ounce. and oil of annis feed, one ounce. mix them together. and take a teafpoonful every morning and evening, the firft and laft thing; this has recovered thofe who were in a confumption.

Trichobezoar

Report of Two Cases

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THE term "bezoar" is applied to masses or concretions found in the stomach or intestines of both men and animals. There are differences of opinion as to the origin of the term, but its derivation has been attributed by most authors to the Arabian term "bad zehr," which denotes counterpoison or antidote.

The subject of trichobezoar or hairball is interesting because of its relative infrequency but also because of the mystical lore surrounding its early development.

The purpose of this paper is to review briefly the subject of trichobezoar and to report 2 cases in detail, 1 of which has been previously reported by the senior author without a follow up.[1] For a thorough and detailed report on bezoars one is referred to the work of DeBakey and Ochsner,[2] which has been liberally used in preparing this paper.

History.—The bezoar was a prized remedy from the time of the Hindus in the twelfth century B.C. until recent times. It was supposed to neutralize poisons, reanimate old age, destroy venoms and counteract vertigo, epilepsy, dysentery, plague and leprosy. It was frequently worn as a charm to protect one from evil. During the Middle Ages bezoars were so highly esteemed that counterfeits were made. More recently the bezoars of the buffalo, when sectioned and placed over a dog bite, were supposed to prevent hydrophobia.[3]

Trichobezoars are particularly common in the cow, the horse and the rat, especially during the hair shedding season. The first recorded case of trichobezoar was reported by Baudamant in the *Journal de Medicine*, Paris, 1779.

Incidence.—In a thorough search of the world literature on bezoars (1938) DeBakey and Ochsner were able to collect 172 cases of trichobezoar, to which they added 1. More recently 5 additional cases have been reported, 3 by Miller and Kurt[4] in an article, "Trichobezoar," in the Journal of Mt. Sinai Hospital (April 1944), 1 by Watt and Harner in a paper entitled "Bezoars Causing Acute Intestinal Obstruction," which was read before the Southern Surgical Association in December 1946 and another by Collins in the discussion of that paper. Thus 179 cases of trichobezoar, including our 2, have been reported to date. Undoubtedly, many cases of trichobezoar have not been reported, but the reported cases reveal the infrequency of its occurrence.

Trichobezoar is most common in the young females. In DeBakey and Ochsner's collected series of cases over 90 per cent occurred in females and over 80 per cent before the age of 30 years. It is interesting to note that phytobezoars (food balls) occur predominantly in men past 30 years of age (Figs. 1 and 2).

Etiologic Factors.—The cause of trichophagia, or "hair swallowing," is open to some debate. Some[6] believe that it is a habit most frequently developed in young girls who wear their hair long and flowing over their shoulders, which predisposes to the placing of strands of hair into the mouth, biting and eventually swallowing them.

Certainly some demented persons practice trichophagia, but believe that psychosis accounts for but a small percentage of cases. Cases have been reported of patients who acquired the habit in the delirium of typhoid. We agree with Golden[7] that the most common cause is some habitual body manipulation similar to thumbsucking, nail biting, etc.

In 1 reported case[8] the patient underwent gastrotomy five times within thirteen years, each time for the removal of a hair ball.

DeBakey and Ochsner have described a diospyrobezoar, or persimmon ball, which they classified as a type of phytobezoar (food ball) representing 73 per cent of all phytobezoars. In both cases reported there was a history of

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From the Wilkinson Surgical Clinic, Huntington, West Virginia.

Submitted for publication Oct. 2, 1950.

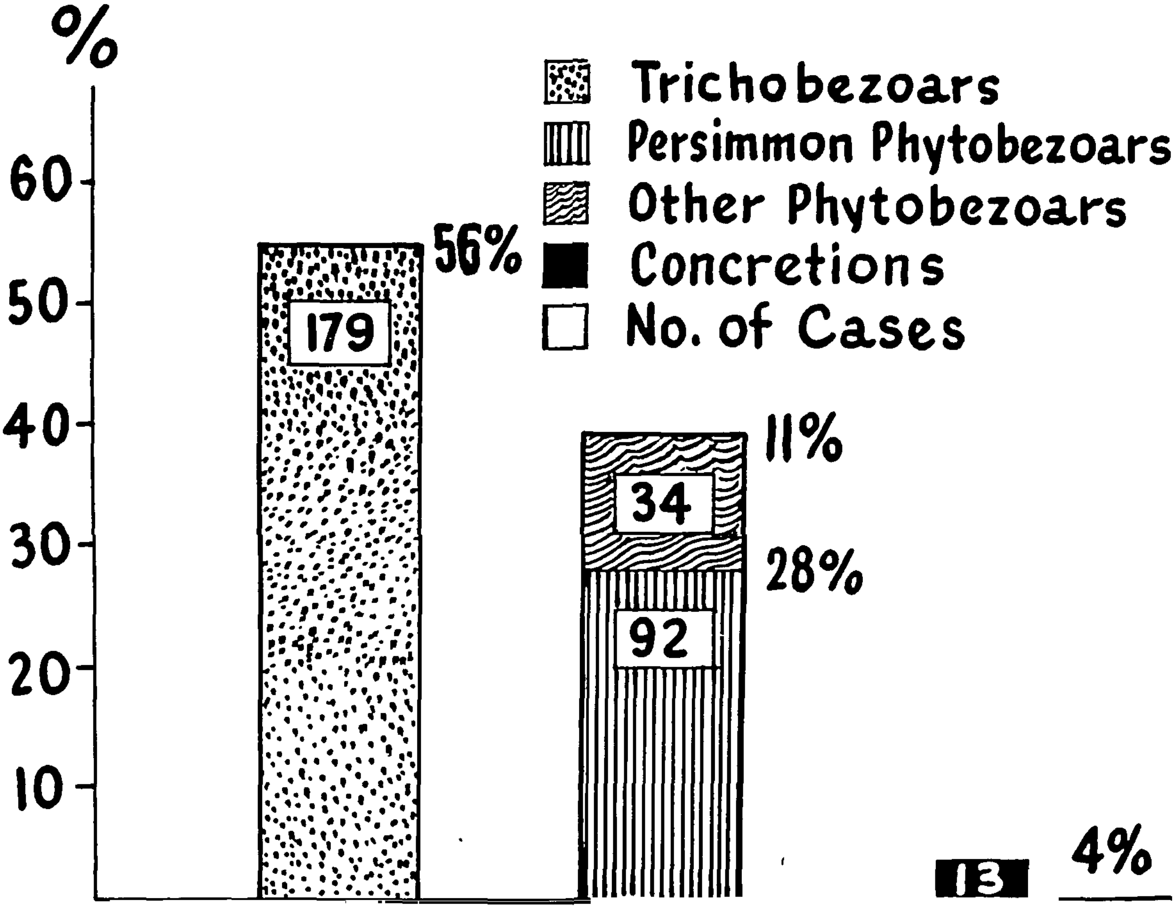

Fig. 1.—Relative incidence of bezoars and concretions on the basis of DeBakey and Ochsner's collected series and cases more recently reported.

eating persimmons for several years. Although both cases represent classic hair balls, from the roentgen and gross appearance, we are convinced that the ingestion of persimmons was a factor in their development, causing formation of a coagulum in which the hair readily became enmeshed. A plausible explanation of this formation was presented by Izumi, Isida and Iwamoto,[9] in whose opinion it is due to the action of gastric juice upon soluble shibuol ($C_{14}H_{20}O_9$), a substance contained in the persimmon. Thus they experimentally produced artificial persimmon balls by incubating small pieces of the fruit in gastric juice.

Diagnosis.—The diagnosis of trichobezoar is not difficult if the condition is borne in mind. We believe that the presentation of a trichobezoar, or any other type of bezoar, is justified if for no other reason than as a reminder of its occasional existence.

As has been mentioned, this condition is by far most frequent in girls in the second decade of life. The history of trichophagia is elicited in but about 50 per cent of cases, but if present, will aid greatly by suggesting the possibility of a trichobezoar. The gross appearance of the child may show short, straight, ragged hair, especially around the temples.

The symptoms usually begin as any other vague gastrointestinal disturbance characterized by anorexia, dyspepsia, nausea, malaise, weight loss and feeling of fullness in the epigastrium. Later symptoms, which develop when the stomach can no longer tolerate the hair ball, are nausea, vomiting and epigastric pain When these symptoms develop, the hair ball will have attained an enormous size and will occupy the entire stomach forming a true cast of this hollow viscus It is amazing that the patient's general health is so little affected by such a large mass occupying a hollow viscus These patients will usually present themselves with an epigastric mass and/or the gastrointestinal symptoms mentioned above The epigastric mass will be freely movable and essentially nontender and run diagonally across the epigastrium

If the aforementioned history and physical signs are elicited the presence of a bezoar should certainly be suspected An upper gastrointestinal roentgen series will confirm the diagnosis The roentgen appearance of trichobezoar as described by Dr H R Crews,[10] roentgenologist at St Mary's Hospital is as follows

"The survey films of the abdomen reveal soft tissue mass which lies in the left upper abdomen Examination of the upper gastrointestinal tract by means of the oral ingestion of barium reveals gross enlargement and immobility of the stomach The ingested barium flows around the margins of the intraluminal gastric mass and outlines the circumference of the stomach Barium which becomes enmeshed within the trichobezoar forms a perfect cast of the stomach, and strands of hair are identified by their thin translucent areas between the flecks of opaque barium Strands of hair may be visible extending into the first

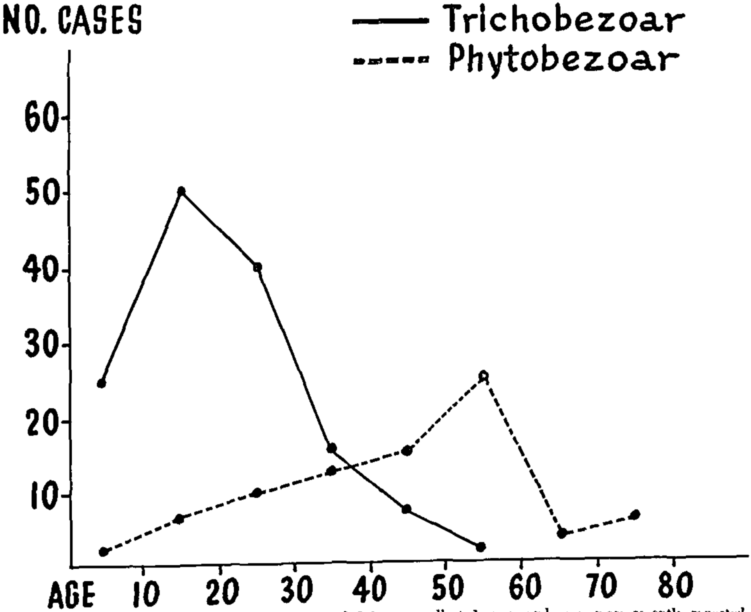

Fig 2 —Age incidence by decades in DeBakey and Ochsner collected series and cases more recently reported

Fig. 3 (Case 1).—*A*, roentgenogram of upper part of gastrointestinal tract after ingestion of barium. *B*, survey film of adbomen after ingestion of barium.

and second portions of the duodenum which are distended with the intra-luminal foreign body and maintain their distended shape in all positions and at all times. There is no appreciable gastric obstruction and barium flows freely into the small bowel. Barium enmeshed within the trichobezoar may remain there for several days."

REPORT OF CASES

Case 1.—R. R., an 11-year-old girl, was admitted to the Chesapeake and Ohio Hospital, Huntington, West Virginia, on Aug. 2, 1946, with an initial complaint of a "knot" in the pit of her stomach, which was first noticed by the child six months prior to admission. The "knot" had been progressing in size until admission to the hospital. The mother stated that the child had lost 10 pounds (4.5 Kg.) in weight during the past six months. No particular weakness was noted, and the child was as active as she had been prior to onset of the illness. Although the mass was noted in February, she was allowed to continue in school because of her apparently normal behavior and lack of subjective symptoms, which were limited to a poor appetite at supper time. Other than this and a severe cough of two weeks' duration, there were no symptoms referable to any system. The past history and family history were noncontributory.

The patient's hair had been cut short by the parents about three years prior to admission to the hospital. Before that time her hair had been long and she frequently put strands of it into her mouth. Also her family, on many occasions, had noticed her playing with a curl of hair in her mouth. She had eaten persimmons on her grandfather's farm every year for at least six years prior to admission. Her father stated that she chewed on anything and everything. She constantly bit her fingernails, chewed pencils and would bite a pencil in two. Her desire for meat was matched by her intense dislike of vegetables So far as could be ascertained she was a perfectly normal child She made average grades in school and played normally with other children

Physical examination revealed her to be well developed and fairly well nourished She was in no apparent distress The heart was normal to auscultation There were scattered rales throughout both lungs The eyes, ears, nose and throat were normal Examination of the abdomen revealed an epigastric mass with its longest diameter in the horizontal plane and extending from the xyphoid process above to midway between the xyphoid and the umbilicus The mass was firm and movable and descended 3 to 4 cm upon inspiration

Laboratory studies revealed the following values hemoglobin 93 per cent red blood cells 4 800 000 and white blood cells 9,900 per cubic millimeter with 66 per cent neutrophils 28 lymphocytes and 6 monocytes The urine was clear and yellow with a reaction of 5 and a specific gravity of 1 024 Negative results were obtained for albumin and sugar The serum protein level was 7 35 Gm per hundred cubic centimeters The serologic value were normal

The preoperative impression of the senior author was that of a hair ball This impression was substantiated by the roentgenologist after an upper gastrointestinal series of roentgenograms had been taken (Fig 3) The patient was treated for bronchitis by the Medical Service until clearance was granted for surgery

On August 24 gastrotomy was performed with cyclopropane and ether anesthesia A left paramedian incision was made and the stomach was delivered into the wound A longitudinal incision was made in the anterior wall of the stomach midway between the greater and lesser curvatures The trichobezoar was removed without difficulty (Fig 4)

The gastric and abdominal incisions were closed and a Levine tube was introduced for continuous gastric suction On the second postoperative day the Levine tube was intermittently occluded after small feedings, and ambulation was started On the third postoperative day the gastric suction was discontinued and jello and custard were given orally Thereafter a regular diet was instituted The immediate postoperative course was complicated by a productive cough without evidence of atelectasis This however, subsided with symptomatic treatment and the girl was discharged, symptom free on the ninth postoperative day

In February 1950 the patient returned at our request for a follow up study, approximately three and one half years after the operation She was then a rather stout 15 year old girl The abdominal incision was well healed, with no evidence of hernia Palpation of the abdomen gave negative results except for minimal tenderness to deep pressure in the epigastrium The practice of trichophagia by the child was denied by herself and her parents A gastrointestinal roentgen series revealed completely normal conditions

CASE 2 —H S a 9 year old girl was admitted to St Mary's Hospital, Huntington West Virginia, on Dec 21, 1949 The chief complaint upon admission was a constant heavy feeling and discomfort in the epigastrium of several weeks' duration The mother stated that the child had been pulling and eating her hair for several years There was almost complete loss of appetite The child had had nausea but no vomiting Her bowel movements had been normal in character but decreased in number during the two or three weeks prior to admission and there was no awareness of hair in the stools She had eaten persimmons on several occasions the last being two or three months prior to admission to the hospital

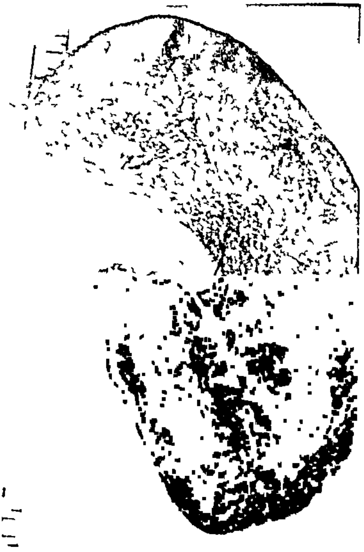

Fig 4 —Photograph of trichobezoar removed at operation in Case 1

Her behavior in school was that of any normal child, and her grades corresponded with those of the average child in her classes. Her behavior pattern at home, it seemed, was very different. The mother constantly told the child and the physicians how terribly nervous the child was. From our comparatively short association with the family, we concluded that the mother was responsible for much of the child's nervousness.

It is interesting to note the method of trichophagia in this patient. She would pull and swallow her hair most frequently while witnessing an exciting motion picture or listening to an exciting serial on the radio. During these tense moments she would wet her index finger, curl a small piece of hair around this finger and jerk the hair out. Then she would place this small ball of hair on her tongue and swallow it.

The systemic review, the past history and the family history were noncontributory.

Physical examination revealed a well developed, poorly nourished child in no apparent distress. The hair, especially around the temples, was straight and ragged or uneven. The heart and lungs were normal to auscultation and percussion. The eyes, ears, nose and throat were normal. The abdomen was thin and sunken and had the appearance of fullness in the epigastrium. Upon palpation there was a definite mass running diagonally across the epigastrium, with the superior portion lying just to the left of the xyphoid process and the inferior portion considerably lower and about 3 inches (7.5 cm.) to the right of the midline. This mass was nontender and freely movable, and the palpating hand could almost encircle it. To palpate it was like feeling the stomach filled with cement. Our impression after the first examination and before roentgen studies were made was "trichobezoar, occupying the stomach." A gastrointestinal series substantiated our impression (Fig. 5*A*).

Laboratory studies on admission revealed the following data: hemoglobin, 76 per cent; red blood cells 4,010,000 and white blood cells 12,800 per cubic millimeter, with 70 per cent neutrophils, 29

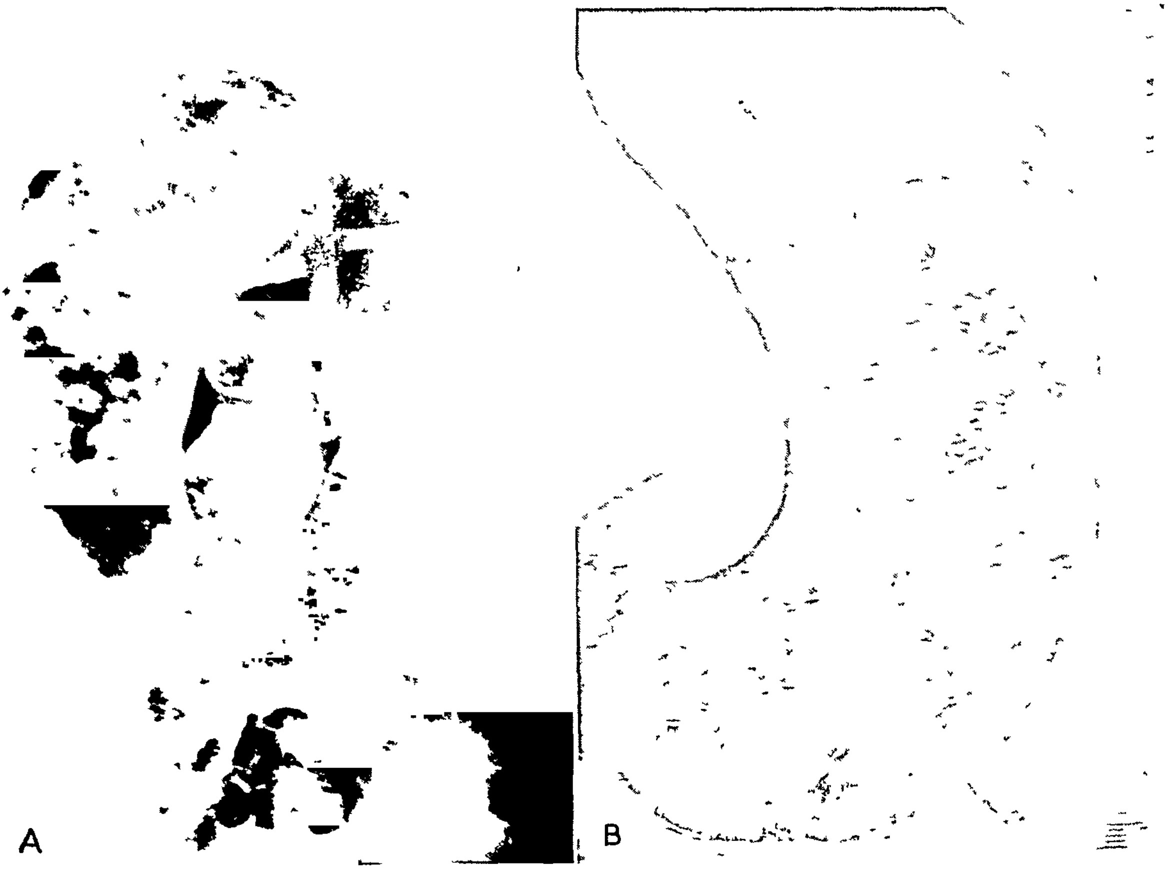

Fig. 5 (Case 2).—*A*, roentgenogram of upper part of gastrointestinal tract after ingestion of barium *B*, photograph of trichobezoar removed at operation.

per cent lymphocytes and 1 per cent eosinophils Serologic tests were normal The urine was yellow and cloudy, with a pH of 5, a specific gravity of 1 024, a trace of albumin, a 2 plus reaction for acetone and no sugar Microscopic examination showed 6 to 8 pus cells per high power field and a few epithelial cells Two transfusions of 250 cc of whole blood were given on successive days

Operation was performed on December 27 with open drop ether anesthesia A transverse incision was made in the midepigastrium the rectus muscles being divided A longitudinal incision was made in the anterior portion of the stomach, and the trichobezoar was removed without difficulty (Fig 5*B*) The gastric incision was closed in layers with a running Connell suture of No 000 plain catgut a serosal suture of No 000 chromic catgut and interrupted silk sutures A Levine tube was introduced into the stomach and constant suction instituted The patient received 500 cc of whole blood during the operation Convalescence was uneventful She was ambulatory on the first postoperative day, feedings were started on the third and the *Levine tube was removed on the fourth* She was discharged, symptom free nine days after the operation The child was observed by the nurse to be pulling and eating her hair before discharge from the hospital

SUMMARY

1 The term "trichobezoar" is applied to a mass of hair occupying the stomach and/or the intestines of either man or any of the lower animals

2 The subject of trichobezoar is briefly reviewed, 2 cases are presented in detail

3 The probability of a persimmon coagulum contributing to, or aiding in, the development of a trichobezoar is presented

4 The relative infrequency of trichobezoar is justification for its occasional presentation

RÉSUMÉ

1 Le terme trichobezoard designe des masses de cheveux qui se forment dans l'estomac ou l'intestin ou dans les deux chez l'homme ou chez certains animaux

2 L'infréquence relative de tricho bezoard justifie sa presentation occasionnelle

3 Le sujet de trichobezoard est brievement passé en revue et 2 cas sont passés en details

RESUMEN

1 El termino tricobezoar se aplica a una masa de cabello ocupando el estómago y/o los intestinos del hombre o los animales inferiores

2 El tricobezoar es relativamente infrecuente y esto justifica su ocasional presentacion

3 Se revisa brevemente el asunto del tricobezoar y se presentan 2 casos en particular

RIASSUNTO

1 Una massa di peli nello stomaco o nell' intestino dell uomo o di animali inferiosi viene designata col termine di tricobezoar

2 La pubblicazione di casi del genere e giustificata dalla relativa rarita'

3 L'A passa in ressegna questo soggetto aggiungendo due casi personali

ZUSAMMENFASSUNG

1 Trichobezoar nennt man eine im menschlichen oder tierischen Magen oder Darm (oder in beiden) gelegene Masse von Haaren

2 Das verhaeltnismaessig seltene Auftreten eines Trichobezoars rechtfertigt die gelegentliche Darstellung eines solchen Falles

3 Es wird ein kurzer Ueberblick ueber das Thema "Trichobezoar" gegeben, und zwei Faelle werden genau beschrieben

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Pitfalls in Colon Surgery

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THE purpose of this paper is to discuss some phases of surgery of the large bowel which present occasions for error in judgment as well as in technical management.

Probably the most frequent complication of malignant disease of the colon is the development of some degree of obstruction. Although most patients with this condition have a history of digestive upsets and changes in bowel habit, the occurrence of obstruction may be so sudden as to cause some panic in the patient and his family and occasional discomposure in the doctor—a situation which too often leads to ill-advised and ill-timed surgical intervention.

In our experience it is most unusual to subject a patient to immediate operation. Decompressing the large bowel finds greater and greater usefulness as the surgeon becomes more familiar with the various decompression technics that can be employed under these circumstances.

Too much emphasis cannot be placed on the use of nasal suction by the Wangensteen method or the Miller-Abbott tube. It is frequently stated that suction will decompress the small bowel but will have little influence beyond the ileocecal valve or the area between it and the obstructing lesion beyond. Fluoroscopic study has demonstrated that few ileocecal valves are actually competent. Most of them permit regurgitation of gas and liquid from the large bowel into the terminal portion of the ileum.

The rather common excuse for an ill-advised emergency laparotomy is that there is little hope of decompressing the so-called "trapped" segment, which lies between the ileocecal valve and the obstructing lesion. If the lesion is low enough in the left side of the colon to be reached by the proctoscope without too much manipulation, one may find it comparatively easy to pass a small rectal tube, or even a small catheter, carefully through the obstructed segment. With the catheter or small rectal tube in place, one may irrigate and relieve the gaseous distention of the large bowel proximal to the lesion.

A surgeon should not attempt passage of the rectal tube or catheter unless he has had adequate training in proctoscopic procedures. It is alarmingly easy to perforate friable walls.

A very vicious practice, which has resulted in disaster on a number of occasions, is the ill-advised use of pituitary-like injections, which tend to produce vigorous peristaltic movements of the intestine. When the obstruction is located in the left side of the colon and there is proximal distention of the large bowel, the occurrence of vigorous peristaltic movements may distend the cecum to such a degree that rupture of its thin wall may occur.

It cannot be denied that some unusual conditions resist all attempts to decompress the large bowel either from below or from above. For patients with these conditions one should plan a method of surgical relief that will be most helpful to the patient and at the same time, not handicap the surgeon in any future operation that may be necessary for radical removal of the obstructing lesion.

It must be remembered that more than 85 per cent of tumors of the large bowel occur in the sigmoid and rectum. With this in mind, it is obvious that colostomies which have their openings on the left side of the abdomen may seriously impede exposure and exploration of the sigmoid and rectum. Cecostomies or transverse colostomies are farthest removed from the commonly made incisions for resection of the sigmoid and rectum.

In a previous article one of us has described a simple cecostomy that will give adequate decompression in most cases of obstruction of the large bowel. It is an interesting fact that the relief of distention by cecostomy is usually followed by patency of the obstructing lesion. The edema and inflammatory reactions often

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subside sufficiently to admit of the passage of gas and fluid through a previously completely obstructed segment.

Irrigation through the cecostomy and through the anus may aid in dislodging small fecal bodies that tend to plug the narrow lumen. One irrigation is not an efficient test of the method. It is sometimes necessary to repeat the irrigations two or three times a day for several days before one is rewarded with the passage of gas and liquids through the normal channel. We have been impressed by local changes observed in and about the carcinoma after employment of decompressive measures.

Many surgeons maintain that a Mikulicz type of operation offers unusual advantages in the obstructed or partially obstructed large bowel. The very suggestion that this operation can be employed in patients with partial or complete obstruction has led to many injudicious interventions. In these cases if the tumor is mobilized and the mesentery divided one can not avoid cutting across the lymph channels that drain the inflamed infected tumor area. The remanipulations that must be performed during mobilization of the tumor tend to contaminate liberally the site of operation.

Any attempt to suture the parallel loops above and below the exteriorized tumor is fraught with great danger because of the friable nature of the thin, distended segment proximal to the obstructive lesion. The amount of gland bearing mesentery that can be removed safely in a primary resection with end to end anastomosis is greater than with any other type of operation directed toward restoration of intestinal continuity. The fact that the two parallel loops which come to the surface must retain mesentery that equals the distance from the posterior position of the bowel to the level of the bowel stomas limits the amount of mesentery which can be resected.

Another pitfall for many surgeons is the employment of some so called “aseptic method” of anastomosis after resection of a malignant tumor of the colon.

We should like to call attention to several serious defects in the technic employed in these operations. Most operations of the aseptic type are done over specially designed clamps which hold the crushed ends of the two segments within their grasp. We have repeatedly called attention to the danger of crushing tissues which are to become part of a line of anastomosis. Crushed tissues offer a favorable site of infection, abscess formation and necrosis. Since the crushed tissues extend around the entire circumference of both segments, there is great danger that infection will invade some part of either of these two ends. Add to the already devitalized ends the employment of a continuous suture around the entire circumference at a short distance above and below the crushed tissue, and the union of these divided ends is further jeopardized.

There is an additional danger in the use of continuous sutures, they tend to constrict the lumen. There is also the danger that a well developed diaphragm may follow the line of the anastomosis. In previous reports we have spoken of the difficulty of suturing the large bowel without passing the needle into the lumen at some point in the suture line. Our experience seems to leave little doubt that the less often we have to employ surgical decompression and the more frequently we can decompress the large bowel by nonsurgical methods the better our results will be.

A bowel which is not distended and one whose bacterial flora has been reduced by suitable bacteriostatic drugs should offer favorable results if the healing capacities of the tissues are not interfered with by surgical trauma due to inept technic.

There is the further requirement that the general healing power of the patient must be brought to its highest level by all modern methods of preoperative preparation. When these requirements are met there seems to be little doubt that primary resection with immediate end to end suture of the large bowel can be employed in most of the accessible regions.

Our experience further leads us to the conclusion that oversuturing and excessive infolding at the suture line associated with the use of devitalizing continuous sutures, are the greatest obstacles to successful repair in operations on the large bowel.

No paper dealing with this type of surgical procedure should fail to emphasize the importance of sound tissue. The more completely surgeons become acquainted with the physiology of tissue repair and regeneration, the better foundation they will have for operative technic and for preoperative and postoperative care.

Certain reasonably accurate indexes have been established by which one can predict the healing capacities of a given patient. Vitamin C levels in the blood offer a fair index of the healing efficiency of connective tissue. Patients with levels of less than 0.7 of Vitamin C per hundred cubic centimeters of blood are not considered good risks. Those whose blood protein levels are less than 6.5 mg. per hundred cubic centimeters are likely to be delayed in recovery.

In most patients with normal or nearly normal tissues an end-to-end anastomosis will be at its weakest sometime between the fourth and the eighth postoperative day. During the first three days, if the suture line is mechannically well approximated, the sutures themselves will keep the tissues firmly united within their grasp. The plastic exudate will cement the area between the sutures, but true tissue regeneration will not have taken place. After the fourth day the tissue within the grasp of the suture will have undergone ischemic necrosis, but tissue regeneration will not as yet have made itself felt to any degree. It will thus be seen that, from the fourth day on, the efficiency of the suture is lessening, and it will be necessary for the tissue repair and regenerative processes to preserve and complete the union of the two ends of the bowel. Great care should be taken to protect the suture line from strain during these critical four or five days.

Suction and an indwelling rectal tube will serve to limit distention. Food by mouth should be withheld to prevent accumulations in the repaired bowel.

SUMMARY

The appearance of obstruction in lesions of the large bowel is not the signal for surgical intervention. In most cases the bowel can be decompressed by judicious use of suction from above and irrigation from below. Decompression should be thoughtfully designed to facilitate subsequent surgical procedure. The Mikulicz operation should rarely be used. Sound principles should govern the use of suture repair of the colon. Aseptic methods are less in demand with bacteriostatic drugs. Tissue crushing of the bowel ends is a detriment to early union. The value of improving the general healing capacities of the individual patient cannot be overemphasized. Knowledge of the healing cycle in united intestines must govern the employment of decompression measures and suggest the limitation of liquid and food intake by mouth.

RÉSUMÉ

La présence d'obstruction dans les lésions du gros intestin n'est pas toujours un signal pour l'intervention chirurgicale. Dans la plupart des cas, l'intestin peut être décomprimé par l'emploi judicieux de suction par en haut et d'irrigation par en bas. La décompression doit être faite soigneusement afin de faciliter la procédure chirurgicale qui doit suivre. L'operation de Mikulicz sera rarement employée. Les principes solides doivent gouverner la reparation par suture du côlon. Les methodes aseptiques seront employées avec les médicaments bacteriostatiques. L'écrasement tissulaire des deux bouts de l'intestin est nuisible à l'union rapide. Il faut avoir recours à tous les moyens généraux pour fortifier le malade. La connaissance des differents procédés de sutures intestinales aide à l'emploi sage des mesures de décompressions et suggère la limitation des liquides et d'aliments par voie orale.

ZUSAMMENFASSUNG

Das Auftreten von Obstruktionserscheinungen bei Erkrankungen des Dickdarms ist nicht das Signal zum chirurgischen Eingriff. In den meisten Faellen kann der Darm durch Ansaugung von oben und Einlaeufe von unten entspannt werden. Die Entlastung muss mit Bedacht geplant sein, um nachfolgende chirurgische Prozeduren zu erleichtern. Die Mikulicz-Operation sollte nur selten angewandt werden. Die Anwendung von Dickdarmnaehten sollte auf vernuenftigen Grundsaetzen beruhen. Auf aseptische Methoden wird bei Gebrauch von bakteriostatischen Medikamenten weniger Gewicht gelegt. Das Zerquetschen des Gewebes an den Darmenden ist einer fruehen Heilung hinderlich. Die Hebung der allgemeinen Heilkraft des einzelnen Kranken kann in ihrer Bedeutung nicht hoch genug eingeschaetzt werden. Die Anwendung von Ent-

spannungsmassnahmen und die Beschraenkung oraler Fluessigkeits und Nahrungszufuhr muss von der Kenntnis des Heilungszyklus zusammengenaehter Darmteile abhaengig gemacht werden.

RIASSUNTO

La comparsa di sintomi di ostruzione nelle lesioni dell'intestino crasso non suona sempre il segnale l'allarme per un intervento operativo. Nella maggioranza dei casi l'intestino può essere decompresso mediante aspirazione dal di sopra, irrigazioni dal di sotto. La decompressione ha lo scopo precipuo di facilitare un successivo intervento. L'operazione di Mikulicz trova poche indicazioni. Le suture per riparazione del colon vanno eseguite con giudizio e con grande accuratezza. Lo allacciamento dei capi intestinali va a tutto [illegible]mento di una rapida guarigione. Gli antibiotici sono utilissimi anche negli interventi asettici.

Gli A. richiamano ancora una volta l'attenzione sopra l'importanza di migliorare le condizioni generali dei pazienti poiché sono queste condizioni alle quali sono principalmente affidati i poteri di guarigione. La decompressione e la limitazione degli alimenti e dei liquidi per via orale debbono basarsi sopra una precisa conoscenza delle fasi di guarigione delle anastomosi intestinali.

RESUMEN

La apariencia de obstruccion en lesiones del intestino grueso no es señal para intervención quirurgica. En muchos casos puede descomprimirse el intestino por el uso juicioso de succion desde arriba e irrigacion desde abajo. Se intentaria cuidadosamente la descompresion para facilitar el procedimiento quirurgico subsecuente. Se usaria raramente la operacion de Mikulicz. Gobernarian los principios de juicio el uso de la sutura para reparacion del colon. Los metodos asepticos son menos [illegible] sin drogas bacteriostaticas. El [illegible] tisular de los cabos intestinales es [illegible] de la union temprana. No puede exagerarse el valor de mejorar las facultades de recuperacion general del paciente. El conocimiento del proceso de cicatrizacion de la union intestinal debe gobernar el empleo de medidas descompresivas y sugerir ingestion limitada de liquido y alimento.

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Familial Adenomatosis

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POLYPS occurring in the colon, their cause and their relation to malignant disease have been a subject of great interest for many years. The term polyps, used in a broad sense, describes any growth, pedunculated or sessile, protruding into the lumen of the bowel. It may also be used to describe a benign true adenomatous tumor. Much confusion exists due to the fact that this term is not used more specifically.

Multiple polyps in the colon has been recognized as a disease entity for many years. Menzel, according to Scarborough,[1] Rankin[2] and others, was the first to call attention to this fact in 1721. With numerous reports appearing in the medical literature, efforts have been made to classify polyps and the disease they produce. Perhaps the most generally accepted is that made on a clinical basis by Erdman and Morris[3] in 1925. These authors classified polyps of the colon into two groups: (1) single, or multiple polyps developing in adults as simple neoplasms (adenomas), or secondary to inflammatory disease; and (2) diffuse multiple polyposis occurring in childhood or early adult life.

Wesson and Bargen[4] in 1934 classified polyps on an etiologic and pathologic basis into similar groups: (1) true polyps and (2) post-inflammatory polyps. Rankin and Fitzgibbon(5) in 1931 classified true adenomatous polyps into three groups, emphasizing their relation to carcinoma.

Familial adenomatosis has been considered a rare disease. Scarborough[1] collected 301 cases reported in the literature up to 1937. McLaughlin[6] 331 up to 1943 and Guptill[7] 347 to 1947. Guptill added 5 of his own. Estes[8] in 1948 added a family study of 6 living children who had the disease. The mother had it also, and her father had apparently died of it. Gardner[9] added 4 cases in 1948, and Boehme[10] added 7 cases reported in 1950. This large number of cases would suggest that the disease is actually not too uncommon. However, the differential diagnosis between familial adenomatosis and acquired polyposis is in many instances quite difficult, and it is entirely possible that several of the cases earlier reported may have been of the acquired type. As Dukes[11] has pointed out, many of the earlier reports have added confusion to the subject, and the question of priority need not be considered in giving this disease a name. In fact, it has been referred to by many authors under a variety of names, such as disseminated polypus, polyposis intestini, multiple adenomas, agminated adenomas, familial polyposis, hereditary polyposis and multiple polyposis.

The classic description by Cripps[12a] in 1882, with his report of the cases of 2 patients, a brother aged 19 and a sister aged 17, called attention for the first time to the familial tendency of this disease. Many writers since that time have reported family studies showing the unquestionable hereditary factor[12b].

As the lesions have also been shown to be true adenomas, it would seem that the name *familial adenomatosis* best describes the disease. This not only clearly denotes the family tendency but distinguishes this disease from multiple polypi, which may or may not be true adenomas, but which for a variety of reasons occur in the colons of persons in whom no familial tendency may be demonstrated.

Lockhart-Mummery[13] has given an excellent dissertation on the causation of this disease, to which little has been added. He asserted that adenomatosis is an example of gene mutation. This is passed on to each succeeding generation as a Mendelian dominant, though it may be a recessive. It is transmitted by both sexes and affects both sexes. If it is a recessive, it should be noted, it may skip a generation only to reappear and plague a subsequent generation.

It is a curious fact that the victim is apparently not born with the disease, but rather with a tendency toward its development,

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which usually appears at about puberty or in early adult life. In the series of cases studied by Hullsiek[15] the average age was 30.9 years. At the time of puberty the hereditary factor seems to stimulate a marked proliferation of the epithelial elements of the colon. As a result of this rapid growth adenomas of uncountable numbers develop in the colon of the affec[illegible] person. This development of a disease [illegible] is wholly different from that of polyps [illegible]ing from inflammation.

Bargen[16] and other investigators have [illegible]gested that the inflammation of colitis [illegible] important role in the formation of [illegible] The condition reported by Virchow[1] [illegible] and called "colitis polyposa" was ap[illegible] of this group. However, as e[illegible] Woodward[18] distinguished true [illegible] from the type secondary to inflam[illegible] to the latter he gave the s[illegible] polyposis." Saint[19] in 1927 wrote [illegible] treatise on polyposis and divid[illegible] into two groups—those which w[illegible] inflammation and those which [illegible] Dukes[2] described the distinguish[illegible] of true polypi and pseudopolyp[illegible] that polyps secondary to inflam[illegible] ease or irritations were irregula[illegible] tour of the tags of mucous membra[illegible] true polyps are smooth and rou[illegible] recently other writers, (Swinton [illegible] ren,[20] and Hellwig[21]) have obser[illegible] lesions associated with colitis are [illegible] adenomas. It would seem, then, that a [illegible]tion should be made between pseudopoly[illegible] multiple adenoma and familial adenomat[illegible] as a rational basis for treatment.

The symptoms of the disease may be delayed for several years. Frequent bowel movements, accompanied with blood and mucus are the most common symptom. The symptoms in each case are in direct proportion to the extent of the disease. As the disease develops the symptoms become more intense. Abdominal pain, colicky and usually associated with tenesmus, is soon followed by anemia and general weakness. As these symptoms are not unlike those of carcinoma, chronic idiopathic ulcerative colitis, specific colitis, diverticulitis, endometriosis with bowel involvement and granulomatous disease of the colon, it naturally follows that such factors must be considered in arriving at the differential diagnosis.

Diagnosis.—The diagnosis of this disease is usually not difficult. Digital examination in most cases will reveal a thickened mucous membrane and the soft polypoid masses can be felt with the examining finger. Proctosigmoidoscopic examination readily reveals numerous adenomas usually varying in size [illegible] to 1 to 2 cm. Some may be in[illegible] eroded but the mucous mem[illegible] smooth and intact over them. The [illegible]brane in the typical case appears [illegible] between the lesions. This is in [illegible] appearance in cases resulting [illegible] which the mucous membrane [illegible] evidence of inflammation.

[illegible]ation reveals the extent of [illegible] may reveal the presence of a [illegible] It is also helpful in dif[illegible] as was pointed out by [illegible] typical case of familial [illegible] the roentgenogram [illegible] strations the wall is of [illegible] and there is no stenosis. If [illegible] is usually associated with [illegible] case of acquired polyposis [illegible] lost, there are defects in [illegible]rn and thickening of the [illegible] stenosis and these changes [illegible] It is well to emphasize, [illegible] in many cases these differences [illegible]t to demonstrate (Fig. 2). Al[illegible] ntiation may be difficult, its [illegible] emphasized in case studies of [illegible] Sloan and Bargen in a [illegible] 000 cases of chronic ulcerative colitis [illegible] wed the incidence of malignant degeneration to be 5 per cent. In all the family studies of familial adenomatosis reported it is recognized that if the patient survives the usual hazards of life and the ravages of the disease malignancy can be anticipated at an early age in 100 per cent of cases.

Treatment.—When the diagnosis of familial adenomatosis has been made, the doctor assumes a twofold responsibility. 1. Because of the familial tendency, other members of the family should be advised of the disease and urged to be examined. To have the other members of the family submit to examination is often not without difficulty, as McKenny[24] has shown. 2. The management of the individual case is a serious problem; each step in the surgical management must be carefully considered.

Roentgen treatment over the entire colon is the only form of conservative treatment available. The reports in the literature on this form of treatment are usually unfavorable.[7] It is generally recognized that treatment of this disease is surgical. If the concept of the disease as described above is accepted, it would seem logical that all mucosal elements in which the hereditary tendency exists should be removed. A study of the recent literature shows that surgeons generally agree as to the need of radical resection, but there is wide divergence of opinion as to how this should be accomplished. Bacon[25] has devised an ingenious operation for transplanting the transverse colon through the preserved anal sphincters, with success in 11 cases. I have performed this operation successfully in 2 cases of multiple adenomas but do not consider it adequate for familial adenomatosis. Jones[26] advocated ileosigmoidostomy and later colectomy performed in stages, removing all the potentially malignant area which would not be visualized through the proctoscope. Mayo and Wakefield[27] in 1936 reported a five-stage procedure to remove the colon and preserve the anal sphincter. Cattell [28] reported 23 cases from the Lahey Clinic. Ileostomy and total colectomy were done in 6, ileoproctostomy and subtotal colectomy in 12 and abdominoperineal resection in 5. He firmly stated, "The treatment of choice is permanent ileostomy and total colectomy, including abdominoperineal resection."

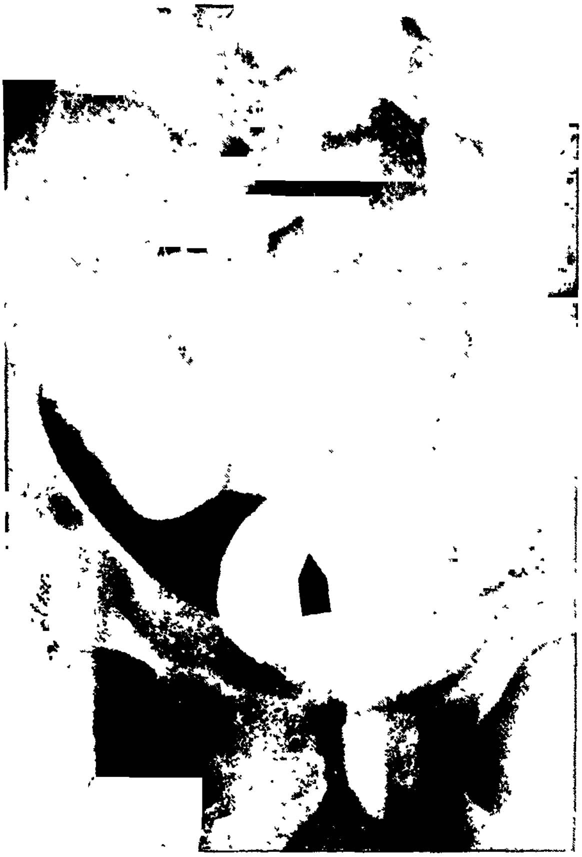

Fig. 1.—Roentgenogram of patient in case reported, a white man aged 32 with lipomatosis and adenomatosis.

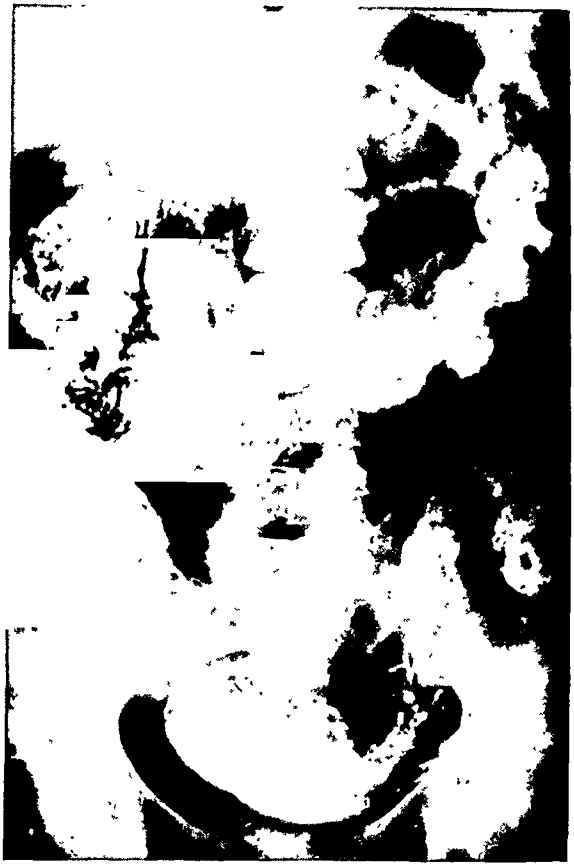

Fig. 2.—Roentgenogram of A. M., a white man aged 41 with polyposis. Treatment was left colectomy with abdominoperineal resection and permanent colostomy of the proximal transverse portion of colon. Excellent clinical result.

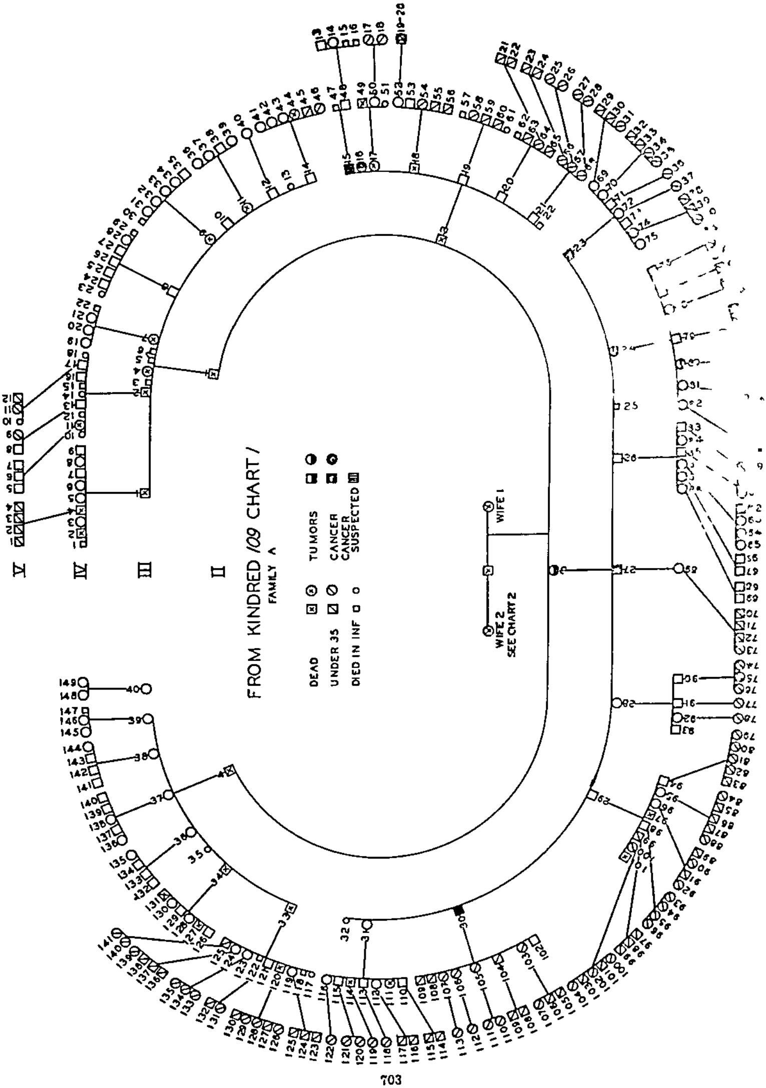

Fig 3 —Familial chart No 1 Family A

Guptill[7] offered a new type of anastomosis and expressed the opinion that the treatment of choice is fulguration of the polyps in the lower part of the rectum and anastomosis of the ileum to the rectum, followed by two-stage colectomy and subsequent observation.

Gardner[9] reported 3 cases in which ileorectal side-to-side anastomosis and colectomy were performed as a one-stage procedure. Hoxworth and Slaughter[29] reviewed the surgical literature from 1930 to 1948, summarizing the surgical procedures reported on during that period. Boehme's recent report[10] of 7 cases in which end-to-end ileorectal anastomosis and colectomy were performed in one stage is most impressive.

Apparently no one can standardize the operative procedure to be used, but it is generally agreed that all potentially cancer-bearing tissue must be removed. Any segment of colon allowed to remain must be kept under observation for the rest of the patient's life. For this reason it would seem that if ileorectal anastomosis is selected an end-to-end anastomosis would be preferable, as this would leave no blind pouch of colon with its potentiality of malignant degeneration; also, this internal ileostomy leaves the patient more nearly normal.

If the patient proves normal after his final operation and if this has been accomplished with the least possible number of operations, other members of the afflicted family will submit more readily to examination and treatment.

In the case to be reported here an open end-to-end anastomosis and a colectomy were performed in a single stage, after the adenomas in the rectum had been fulgurated.

This case is to be identified in Figure 4 as No. LV, 219. It is one of the cases included in the study being conducted in the Laboratory of Human Genetics at the University of Utah (Figs. 3 and 4) by Drs. F. E. Stephens and E. J. Gardner.[22] As will be noted, the study is still in its preliminary stage. The ultimate outcome should result in identification and treatment of the condition in several additional cases.

In this particular case it appears from a study of the family that members afflicted with adenomatosis also have multiple lipomas, a fact known to themselves for some time. The patient himself said, "I am sure my daughters will develop the disease, as they have the superficial tumors, and members of the family with these tumors have bowel tumors also." (Proctoscopic examination of the daughters, aged respectively 5 and 9 years, revealed no evidence of adenomatosis. This fact will be investigated further in the study, as no other family seems to have been observed in which a second type of tumor appears to follow the same hereditary pattern as the adenomatosis. This fact may account for the common knowledge of their ailment among members of the family. It is interesting to note that in a letter written by the patient's uncle [III-70] to his niece [IV, 214] in 1942, soon after undergoing an abdominal operation of unknown type for cancer of the colon: "The curse of the family has returned since the operation." He died soon after this letter was written.)

REPORT OF CASE

A white man aged 32 was referred for examination because of blood in the stools. This had first appeared eight months earlier. Roentgen studies of the colon were not diagnostic. Proctosigmoidoscopic examination revealed multiple adenomas throughout the rectum and the distal portion of the sigmoid. These were partially fulgurated at the time of examination and completely fulgurated before operation was performed. The patient was immediately advised of the nature of his disease. He was aware of the family history as noted here:

II-7 and her descendants	
Died of cancer of colon or rectum	8
Died of cancer of stomach with metastases	1
Died of causes other than cancer	3
Died in infancy	5
Living, over 35 years of age	8
Living, 35 years of age or younger	19
	44

He had recently seen his brother die of carcinoma of the colon at the age of 30 and desired surgical intervention for himself as soon as possible.

The patient was in good general health and had been working daily until admission. General physical examination gave essentially negative results except for several lipomas over the extremities, scalp and trunk. Proctoscopic examination revealed multiple adenomas, fulgurated as described. Blood values, including that for serum protein, were within normal limits, but routine transfusions were

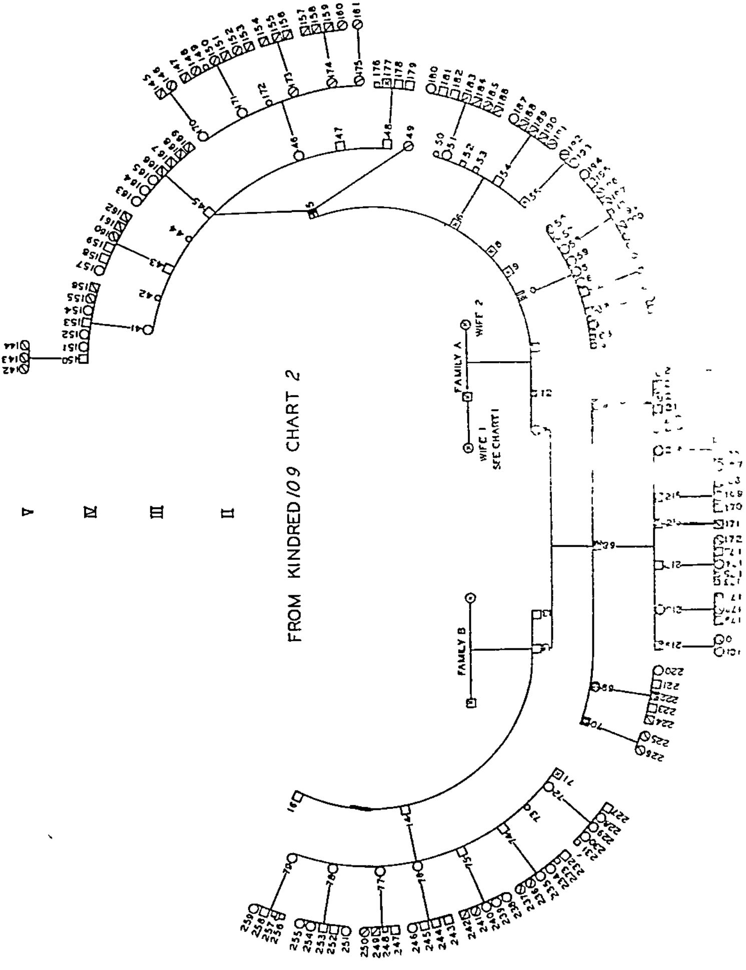

Fig 4 – Partial chart No

given before operation on the colon was performed. A low residue, high protein diet was ordered. Sulfasuccidine and dihydrostreptomycin were given in indicated doses.

With the region under spinal anesthesia, operation was performed on March 22, 1950. The abdomen was opened through a long midline incision extending to the left of the umbilicus. Palpation of the abdominal contents revealed no pathologic signs, and no polyps could be palpated with certainty. Nevertheless, in view of the proctoscopic picture and the known family history, a colectomy was done.

A point approximately 5 cm. proximal to the ileocecal juncture was selected, and the ileum was divided between clamps with a cold knife. The colon was likewise divided with a cold knife at the peritoneal reflection. An end-to-end open anastomosis was then done, a continuous triple No. 0 chromic catgut suture being employed for the mucosa. This was reinforced with interrupted No. 40 cotton sutures. At the conclusion of the anastomosis a mushroom catheter previously placed in the rectum was passed up through the anastomosis. The colectomy was then started by dividing the lateral reflection of the parietal peritoneum. The right colic artery was identified and doubly ligated. The dissection was carried over to the midcolic artery, and at this time the right lumbar gutter was closed with a continuous plain No. 1 catgut suture. The midcolic artery was then doubly ligated and the dissection carried over to the splenic ligament, which was divided. The dissection was carried down the left lateral leaf of the peritoneum to the left colic artery. The artery was ligated and the colon removed. Peritonealization was carried out, a continuous plain No. 1 catgut suture being used. The mesentery of the ileum was sutured to the posterior peritoneum to close this space and thus prevent herniation as well as too free movement at the site of the anastomosis. The abdomen was closed without drainage.

Pathologic Picture—The colon, removed, measured 98.0 cm. in length. Five cm. of terminal ileum was attached to the proximal portion. The serosal surface appeared normal throughout. The appendix was attached and measured 9 by 5 cm. There were numerous adenomas on the mucosal surface throughout the length of the colon. These adenomas were more concentrated in the sigmoid and cecal regions. The largest measured 9 cm. in diameter. The mucosa of the colon appeared normal except for the polyps. None of the polyps appeared to be ulcerated.

More than 25 polyps were sectioned and examined. No evidence of malignancy was observed.

The postoperative course was uneventful. The anastomosis functioned well, and the patient left the hospital on the ninth day.

SUMMARY

1. A review of familial adenomatosis again emphasizes the fact that it is a neoplastic disease with a definite hereditary tendency.
2. Malignant degeneration can be anticipated in 100 per cent of patients who survive to early adult life.
3. These known facts justify and indicate radical surgical intervention including removal of the entire colon when the disease is diagnosed.
4. The time and method should be selected by the surgeon according to the individual case.
5. The disease occurs frequently enough to be recognized as one calling for radical surgical intervention. It is not to be regarded as a medical curiosity.
6. Any segment of colon allowed to remain must first be shown to be free of malignant disease and must be kept under close observation for the remainder of the patient's life.
7. Familial adenomatosis is the name suggested as being most descriptive and least confusing for this interesting condition.

RÉSUMÉ

1. Une revue de l'adénomatose familiale démontre le fait que c'est une maladie néoplastique avec une tendance hériditaire définie.
2. la dégénération maligne peut être anticipée dans 100% des malades qui vivent jusqu'aux premieres annees de la vie adulte.
3. Ces faits justifient et indiquent une intervention radicale chirurgicale demandant l'ablation de tout le colon quand la maladie est diagnostiquée.
4. Le temps et la méthode seront choisis par le chirurgien pour chaque cas individuel.
5. La maladie survient assez fréquement pour être reconnue comme une qui demande une intervention chirurgicale radicale. Ce ne doit pas être envisagé comme une curiosité médicale.
6. Tout segment du côlon conservé doit être démontré comme etant libre de toute lésion maligne et doit être soumis à une observation continue pour le reste de la vie du malade.
7. L'adénomatose familial est le nom sug-

géré commele plus descreptif et moins contus pour cette condition intéressante

RESUMEN

1 Una revisión de la adenomatosis familiar señala de nuevo el hecho que es una enfermedad neoplásica con tendencia hereditaria definida

2 Puede anticiparse la degeneración maligna en el 100% de los pacientes que llegan a la edad adulta

3 El conocimiento de estos hechos justifica e indica la intervención quirúrgica radical, incluyendo la extirpación completa del colon cuando se diagnostica la enfermedad

4 El cirujano habría de seleccionar el momento y el método de acuerdo con el caso particular

5 La enfermedad ocurre con bastante frecuencia para ser reconocida cuando se es llamado para la intervención quirúrgica radical No mirarla como una curiosidad médica

6 Cualquier segmento de colon que haya de dejarse debe mostrarse primero libre del proceso maligno y mantenerse bajo estrecha observación por el resto de la vida del paciente

7 Se sugiere el nombre de adenomatosis familiar como el más descriptivo y menos confuso para esta interesante enfermedad

ZUSAMMENFASSUNG

1 Eine erneute Durchsicht der familiaeren Adenomatose fuehrt wieder zur Betonung der Tatsache, dass es sich hier um eine neoplastische Erkrankung mit ausgesprochener Neigung zur Vererbung handelt

2 Maligne Entartung kann in hundert Prozent der Kranken, die das fruehe Erwachsenenalter erreichen, erwartet werden

3 Diese bekannten Tatsachen rechtfertigen und erfordern radikale chirurgische Behandlung einschliesslich der Resektion des gesamten Dickdarms, wenn die Diagnose gestellt ist

4 Den Zeitpunkt und die Art des Eingriffs muss der Chirurg je nach Lage des einzelnen Falles waehlen

5 Die Erkrankung tritt haeufig genug auf um als ein radikale chirurgische Behandlung erheischender Zustand anerkannt zu werden Sie darf nicht als medizinische Kuriositaet betrachtet werden

6 Bevor ein Abschnitt des Dickdarms im Koerper belassen wird muss nachgewiesen werden dass er frei von Krebs ist Danach muss der Dickdarm fuer den Rest des Lebens des Kranken unter strenger Beobachtung bleiben

7 Der Name ‘familiaere Adenomatose’ scheint diesen interessanten Krankheitszustand am besten zu beschreiben und am [illegible]sten verwirrend zu [illegible]

RIASSUNTO

1 Un esame della lette[illegible] matosi familiare d[illegible] che questa rappresen[illegible] con una netta te[illegible]

2 Nel 100 % de[illegible] l'eta' giovanile e' d[illegible] zione maligna

3 L'adenomat[illegible] considerata quale [illegible] come una vera [illegible]

4 Ogni qualvolta [illegible] viene diagnosticata [illegible] operazione radicale che [illegible] zione dell intiero colon

5 La data ed il metodo di operazione [illegible] scelti dal chirurgo in base alle condizioni dei singoli soggetti

6 Qualora una porzione del colon venga lasciata, bisogna prima accertarsi che questa non sia coinvolta dalla neoplasia E' d'altra parte necessario un controllo per il resto della vita

7 Il termine di adenomatosi familiare e quello piu' comprensivo e piu' adatto per quest'interessante malattia

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Bisexuality and Carcinoma

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SURGERY, as a department of practical medicine, is confronted with a change of great importance in the treatment of certain forms of carcinoma Indeed, medicine as a whole, including biology, pathologic anatomy, eugenics and the theory of heredity must define its position with regard to a problem that seems to undermine the former basic concept of the cause of malignant neoplasms the concept of morbidity and eventually the rationale of prophylaxis

This problem is the *problem of bisexuality* It is a very old problem Chinese medicine made it the center of its system of general pathology three thousand years ago It is the fate of many fundamentally sound ideas to be displaced again and again by intrusive and directly realizable theories, only to reappear from time to time in periods of confusion or renascence

Knowledge of the bisexual nature of man is revealed in the religious myths of all high civilizations It is represented in the plastic arts, both sacred and profane It has had its place in the philosophic world from Plato to Schopenhauer Only now, however, does it enter into the complex problems of practical medicine, and the profession has no choice but to face it and arrive at a definitive attitude toward it

At present this problem presents a double aspect On the one side there is a massive though not in the least homogeneous, complex of facts certainly not free from vagueness and contradiction but nevertheless capable of being crystallized into striking deductions based on a continuous course of experience On the other side there is a broad biopathologic perspective with philosophic implications of the most alluring, based perhaps at many points on rash conclusions but on the whole coverable by a working hypothesis worthy of the most careful attention

The most significant item in the complex of facts is the astonishing influence of crossed sexual hormones on carcinoma of the secondary sexual organ Since Charles Huggins professor of urology at the University of Chicago proposed resection with castration and hormonal feminization as the standard treatment of prostatic carcinoma bisexuality has become a fact of prominent importance Relevant hypotheses which for the purposes of this article may be taken for granted, are provided by the investigations of Moszkowicz Blum [illegible] Swoboda and Fliess

The mere existence of morphologic characteristics of [illegible] sex [illegible] individual subject, however [illegible] the scope of this discussion [illegible] is to emphasize the b[illegible] permanently qualified [illegible] to function [illegible] est Or [illegible] the fact that man [illegible] es shared by [illegible] ratio of combination [illegible] efficient of either [illegible]

Certain [illegible] can produce in the [illegible] of the opposite [illegible] it [illegible] en it has thitherto [illegible]

The [illegible] is therefore divided into several subcategories It includes the familiar morphologic [illegible] known as hermaphrodism pseudohermaphrodism pseudothelia (Benda), pseudohermaphroditismus internus or externus hermaphroditismus verus bilateralis or alternans and ovotestis It includes also the disturbances of sexual function that originate in predisposition (androgyny homosexuality virilism) those that result from artificial causes (castration syndrome) and those that represent pathologic conditions (pubertas praecox, hypergenitalism, hypogenitalism change of sex due to renal tumor pinealoma or tumor of the hypophysis polythelia polymastia amastia and gynecomastia)

The morphologic and temporal coexistence

Submitted for publication Sept 28 1950

to an extremely important conclusion, namely that the hypothesis of a *biologic genesis for some forms of carcinoma* is probably founded on fact. It follows, of course, that the problem of bisexuality becomes a problem of general biopathology.

The proportion of male and female in any given human being is hereditary. Variations in functional rhythm between the male and female hereditary components show that an early decrease in the one involves stimulation of the proliferating tendency of the other (Swoboda). Yet nothing is said about the determination of the organ in the individual case although it can be included without hesitation in the general hypothesis. The localization of carcinoma within a system of organs may, then, result from exogenous conditions. All functions known as carcinogenic can here be active.

Proof of the nonsynchronous growth of the male and the female component has already been presented. Ackermann reported at a conference of the American Chemical Society in Atlantic City, the results of his researches in Washington and St Louis, emphasizing the fact that the proportion of amino acids is clearly different in young and old men and in young and old women. Three amino acids showed an obvious quantitative decrease as the age of the men increased whereas they remained constant in the case of women. Two other amino acids showed a measurable decrease in women but not in men.

The next goal to be approached by the working hypothesis will be definition of the position of each individual subject on the male female line and perhaps the establishment of an index of the occurrence of carcinoma. Research in this direction has been in progress for some time.

Wendt has taken as a starting point of his research the fact that the unrestrained tendency toward division and propagation which is characteristic of the protozoon cell is latent in the metazoon cell during the whole process of phylogenetic development. If a cell group in a metazoon "glides past the regulating influence of the cell state in the course of the nonsynchronous growth, there must exist a possibility that in these cells qualities arise which have dwelt within them since the unicellular phase. For unicellular life is continual division occurring as the result of physiologic growth. In the multicellular organism of the metazoon this manner of cellular reaction means cancerous degeneration of the cells." The last link in the chain of ideas is herewith given.

The possibility of polysymbiosis, i e the birth of the metazoon, was conceived only by abandoning the concept of the immortality of the unicellular being (Vogt). Polysymbiosis requires differentiation of activity and at the same time sexual propagation. The well marked sexual characteristics maintain their life rhythm in the descendants. The *[illegible]* of the hereditary qualities [illegible] state asynchronous growth and [illegible]. The [illegible] *harmony* arouses the latent [illegible] of the unicellular being which [illegible] the predominant role. Nature itself [illegible] may become the cause of cancer.

Sex pronounces the sentence of death to the victim. Every organism born by a sexual process comes into existence through the mixture of a male and a female primary substance. Complete homogeneity therefore cannot be expected. The original differentiation necessarily manifests itself in the process of life. Thus the *bastard nature of the individual* (Swoboda) in the sense of bisexual disposition becomes a natural danger to his life, a danger maintained throughout life and increased or decreased by his mixed nature depending on the individual peculiarities of his procreators.

As has been said, bisexuality as a medical problem is no new concept. The ancient Chinese adopted the idea of disharmony between the Yang and Yin (male and female) elements as an explanation of morbid symptoms which were thought to result from incongruity in physical elements. This old conception is in accordance with the "new" conviction that a certain dualism governs all nature and that any living being may become its victim.

With this conclusion the problem of bisexuality reapproaches the "myth" from which it once departed in the first ecstasy of scientific knowledge. But is not a glimmer of myth indispensable to our intellectual life?

SUMMARY

The problem of bisexuality is prominent in

basada sobre bien conocidos hechos morfológicos y funcionales, señalan la importancia de determinar el estado exacto en el caso particular. En lo que atañe a la génesis biológica de ciertos carcinomas, la naturaleza bisexual del hombre y la desigualdad cronológica del envejecimiento en el elemento masculino y el propio envejecimiento en el elemento femenino aparecen como factor importante en ciertos problemas patológicos

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Most men have died without creating, not one has died without destroying
—*Dumas*

Everybody exclaims about ingratitude Are there so many benefactors?—*Boucart*

Omit a few of the abstruse sciences, and mankind's study of man occupies nearly the whole field of literature. The burden of history is what man has been of law, what he does; of physiology, what he is; of ethics what he ought to be of revelation, what he shall be.—*Finlayson*

A transgression, a crime, entering a man's existence eats it up like a malignant growth, consumes it like a fever.—*Conrad*

Incivility is not a vice of the soul, but the effect of several vices—of vanity, ignorance of duty, laziness, stupidity, distraction, contempt of others, and jealousy
—*La Bruyere*

The man who has no sense of beauty is a bad painter, a bad friend, a bad lover, he cannot lift his mind and heart to goodness —*Joubert*

A phlegmatic character, a weak and languid will, can get on and hold its own with a small amount of intellect; what is naturally moderate needs only moderate support.—*Schopenhauer*

Few men are worthy of experience. The majority let it corrupt them —*Joubert*

Life is like playing a violin solo in public and learning the instrument as one goes on.—*Butler*

The mind celebrates a little triumph every time it can formulate a truth.
—*Santayana*

Fanaticism consists in redoubling your effort when you have forgotten your aim.
—*Santayana*

An obstinate man does not hold opinions; they hold him —*Pope*

The envious praise only that which they can surpass; that which surpasses them, they censure.—*Colton*

products, and endocrine or hormonal secretions would seem to be the allergens causing sensitivity." Rowe[12] pointed out that allergy best explains the primary lesions of the disease. Vascular allergy can explain the erythema, edema and easy bleeding. Herpetic ulcers can arise from vascular thrombosis, similar to oral canker sores due to nutritional pharmaceutical or bacterial allergies Hyperperistalsis rushing pancreatic enzymes into the colon can cause denudation, leading to *perforation, bleeding or gross hemorrhage* Chronic allergy can produce scar tissue [11] In fact, the entire picture, according to Rowe, *can be explained by allergy. Andresen has* shown that hypersensitivity of the mucous membrane to food may cause acute ulcers of the colon. However, according to Bassler,[7] ulcerative colitis in a person with food allergy can be aggravated by the allergy, intensifying the infective and inflammatory picture and making allergy an accessory factor rather than the cause. Rowe stated that localization of this disease in the rectum or other parts of the colon is better explained by allergy than by infection. Bassler and Mackie agreed that food allergy plays an important role in chronic ulcerative colitis, but said that food allergy alone cannot produce the picture of the disease. Mackie[2] concluded that sensitization of *the colon develops after the onset of the primary* pathologic reaction.

Another cause recently brought to attention is the *psychosomatic or psychogenic factor* Grace, Wolf and Wolff[13] have pointed out that the relation between periods of emotional stress and the onset and exacerbation of symptoms in patients with chronic ulcerative colitis has been well established. Wolf and Wolff noted the spontaneous occurrence of minute submucosal hemorrhages in association with protracted and sustained feelings of hostility, resentment and anger. Dennis and others have *observed petechial lesions in patients with* ulcerative colitis during anger. Grace and his co-workers emphasized the need of considering the ultimate outcome if sustained hyperfunction from emotional distress is allowed to continue, pointing out that it would probably result in bleeding, anoxemia of the tissues necrosis, sloughing and the formation of ulcers. It is true that in almost every case of ulcerative colitis there are instances of exacerbation due to emotional upsets and instances also of recurrence or relapse, but Bassler[3] rejected the theory that emotional upset *per se* can be the direct cause of ulcerative colitis. The colon is closely associated with the brain and it is not difficult to understand why a patient whose colon is diseased is locally disturbed by an emotional upset Portis[5] in his review of the psychiatric literature of presumable cures of uncomplicated and early ulcerative colitis in which lasting remissions are claimed maintained that such remissions are due to "normalizing" the gastrointestinal tract, *especially the sigmoid and rectum*, with respect to the physiologic picture Bassler has said that emotional states have about the same significance as allergic factors namely that they unstabilize an already diseased and degenerated colon Warren and Sommers[1] agreed that the importance of psychosomatic influence in the genesis of ulcerative colitis cannot be disregarded It is already known that fear and other emotional stresses can provoke the release of potent circulating chemical agents, including substances with proteolytic properties

The more recent work on *lysozyme theory* brought to attention by Meyer and his associates[14] proposed the hypothesis that chronic *ulcerative colitis may be due to a combination* of local overproduction of lysozyme, followed by necrotizing action on the mucosa by the indigenous bacterial flora In cases of ulcerative colitis they observed as much as 44,400 units of lysozyme, the value in a normal control group in twenty-four hours being around 528 units The high titer of this mucus points to the colon as the source of the enzyme, and these authors assumed that the enzyme prepares the way for the *necrotizing effect* by removal of the protective superficial mucus Bassler pointed out that, although lysozyme is *supposed to dry* the bowel and make it susceptible to infection, in many chronic biotoxic intestinal states (putrefactive) the mucosa is atrophic and dry and yet there is no tendency to the disease.

I agree with Bassler that the term "cure" cannot be used in connection with chronic ulcerative colitis The term "control," qualified as good, fair or poor, is all that is per-

for chronic ulcerative colitis is extremely difficult, although a certain rationale is indicated. If the disease is acute, severe or fulminating hospitalization is necessary. Adequate fluid intake, transfusions, sedatives and even emergency surgical intervention may be indicated. But in dealing with the chronic condition even though it is in an acute phase, hospitalization cannot always be arranged. Each patient has individual problems, not all can afford to do as the doctor would like, especially those in the middle income bracket who cannot spare the considerable time necessary to arrest this condition but must work while being treated. One must first rule out all known pathologic states, such as achlorhydria, and the differential diagnosis must rule out amebiasis, bacillary dysentery, lymphopathia venereum, tuberculosis enteritis, etc., before treatment for ulcerative colitis can be started.

First of all, rational management must include optimum nutrition. A high caloric intake is required, a diet high in protein, vitamins and minerals but restricted in content of starches and sugar. One must take food allergy into account, since in many cases the condition is initiated or aggravated early by improper foods. Rowe[12] has recommended limiting meat to lamb. All agree that milk, eggs and wheat are the most common exciting factors. The main feature seems to be a bland nonirritating diet with a low residue. Supplemental intake by parenteral methods is important, as are repeated transfusions. Someone has made a statement I consider extremely important: "Blood is the only fluid given parenterally that can be taken away as successfully." Too much other parenteral fluid, even though needed may cause an imbalance and unforeseen complications. Whole protein seems better for an anemic person than the digested types of food (amino acids, etc.). Duodenal[10] and gastric extracts are used successfully in many cases although the disagreeable taste and odor are difficult to overcome. (In 2 cases gastric extracts completely arrested the ulcerative colitis, and after eighteen months there has been no recurrent attacks or episodes.)

The drugs used for this condition are numerous. Briefly, atropine and allied drugs are used (with sedatives) to control spasm and nervousness. Infection is controlled by the nonabsorbable sulfa drugs (sulfasuxidine, sulfathalidine, etc.) and antibiotic drugs (streptomycin, aureomycin, chloromycetin, terramycin and penicillin). In administering these drugs allergies must be considered. A drug occasionally mentioned in literature is tincture of deodorized opium to control the severe diarrhea and cramps. Paregoric is mentioned frequently. There are differences of opinion [illegible] to the use of [illegible] preparations to control diarrhea. In Port[illegible] opinion [illegible] bismuth [illegible] is d[illegible] the [illegible] of the feces may cause [illegible] and perforation.[5] Irrigation or retention [illegible] have been [illegible] widely of late. I have used [illegible] ation [illegible] successful results [illegible] no unfavorable reaction. The [illegible] recently [illegible] proven excellent except in those of sulfa drug allergy. Mayo[17] has used this drug for several years in the treatment of ulcerative colitis with some degree of success. The speediest response to treatment appeared in those patients who showed the lowest chronicity. These patients also showed the most lasting results. This bears out my own experience: in 10 cases response has been satisfactory, with complete arrest for over a year in 3 of the 10 cases. Meyer and his co-workers[15] showed *in vitro* that nisulfazole inhibited lysozyme and my own experience in treatment has borne out the possibility of the reduction of mucus, the inhibition of lysozyme, which in theory can cause ulceration of the mucous membrane. Prudden and Wills[8] have stated that it is a valuable therapeutic adjunct in the treatment of ulcerative colitis, particularly when all or most of the involvement is in the rectum and the lower part of the sigmoid. When there is involvement of the entire colon with evidence of chronic damage and polypoid hyperplasia improvement is less noticeable. Bassler expressed the opinion that drug instillations and irrigations, no matter what the drug, are useless and often vicious. Such drugs as sodium alkyl or laurel sulfate[2] to wet down or absorb the excess pancreatic enzyme and trypsin are valuable adjuncts in therapy, again in preventing enzymatic action on the unprotected mucous membrane.

ACTH, a new drug, was tried by a colleague in a case of fulminating ulcerative colitis (in which ileostomy was thought too dangerous), with remarkable results. The diarrhea ceased in two days; the patient was up and around in two weeks, and at present is in remarkably good health. This seems to confirm the theory that the parasympathetic system is the prime source of the disease.

Vaccines have played an important role in therapy in the past and are still useful as aids in building resistance to secondary infection, particularly of the streptococcic type, as used by Bargen[6] and various workers since.

Psychotherapy.—The early stage of ambulatory treatment is the best time to question the patient as to any emotional upsets, fears, worries, maladjustments, depressions and anxieties he may have. Thorlakson[9] has wisely said that painstaking explanation of the treatment is of more value than the reiteration of general assurances. No one can deny, however, that emotional upsets do cause exacerbations, and it seems only wise that some form of psychotherapy be instituted in the course of treatment; any deep-seated, complex emotional patterns should be handled by a psychiatrist. According to Andresen,[11] it is remarkable how rapidly the patient's mental attitude improves when the symptoms begin to subside. Psychotherapy is particularly indicated when surgical intervention is necessary for a patient who dreads ileostomy and its upsetting mental and emotional problems.

Surgical Intervention.—There are still no definite criteria as to the exact time when operation is indicated. Early operation is a highly controversial subject, and the decision requires the utmost cooperation of surgeon and internist. Fansler and Frykman[20] have advocated earlier and more frequent surgical intervention.

The operations may be classified into four groups: (1) ileostomy alone; (2) ileostomy and complete colectomy, with or without removal of the rectum; (3) partial or complete colectomy with anastomosis of the ileum to the remaining segment of colon or rectum, and (4) vagotomy.

Ileostomy may be temporary or permanent. Temporary ileostomy may be required as an emergency measure in the presence of acute fulmination or in the treatment of carefully chosen patients in whom rigid medical therapy brings about no improvement. Improvement is usually quick and marked in selected cases, but restoring the continuity of the bowel often causes recurrence. In the vast majority of cases ileostomy is a preliminary step to colectomy.

Ileostomy with colectomy[9] (complete) is a two-stage operation, because of its magnitude. This procedure is usually recommended for a colon in which extensive irreparable damage and complications, such as strictures, polypoid degeneration or carcinoma, have occurred. Thorlakson[9] described concisely the surgical procedures I am accustomed to use. Colectomy has given the best results in this disease when the internist and the surgeon have worked in close cooperation and operation was performed at the time approved by both.

Colectomy with anastomosis of the ileum to the sigmoid or the rectum has been used in selected cases.

Vagotomy is a recent procedure and is still under careful observation. It seems most effective in the early stages of chronic ulcerative colitis, when no severe damage has taken place, and in cases of the acute form of the disease. Fansler[19] reported a favorable percentage of improvement after vagotomy done by Dennis and has recommended it in several instances.

SUMMARY

Chronic ulcerative colitis is a neurotrophic disturbance of the colon with predisposing complex factors initiating the onset, such as infection, allergy, nutritional disturbances and psychogenic factors. The specific cause has not yet been determined. Treatment involves rigid medical management, especially of the complex aggravating factors, allergy, nutritional disturbance and infection. Psychotherapy is indicated for deep complex emotional factors and especially for surgical intervention concerning ileostomy. Irrigations of nisulfazole, despite many writers' objections, in the author's experience have proved to be a therapeutic aid in a large percentage of cases. There is a new trend toward earlier operation, based on complete agreement between the surgeon and the internist. Vagotomy is used largely in the presence of acute and

early chronic cases, although the 2 patients in whom the writer was interested died Surgical intervention is definitely indicated for complications of ulcerative colitis especially carcinoma

RÉSUMÉ

La côlite chronique ulcérative est un derangement neurotrophique du côlon avec facteurs compliqués prédisposant, l'infection l'allergie, les troubles nutritifs et les facteurs psychogéniques La cause spécifique n'a pas été déterminée Le traitement demande une surveillance médicale rigide surtout des facteurs compliqués emotionnels, des derangements nutritionnels et de l'infection La psychotherapie est indiquée pour les facteurs émotionnels compliqués et aussi pour l'intervention chirurgicale intéressant l'ileostomie Les irrigations de nisulfazole, quoique peu appreciées par certains, a donné a l'auteur des résultats très satisfaisants dans la majorité des cas, Il y a une nouvelle tendance aux operations precoces basée sur un accord complet entre le chirurgien et le médecin La vagotomie est employée beaucoup dans la présence des cas aigis et dans les cas chroniques récents bien que 2 des malades dans lesquels l'auteur etait interessé moururent L intervention chirurgicale est indiquée pour les complications des côlites ulceratives, surtout pour le carcinome

RESUMEN

La colitis ulcerosa crónica es un trastorno colico neurotrófico, que presenta factores complejos predisponentes iniciales, a saber infección, alergia, trastornos de nutrición y factores psicógenos No se ha determinado aun la causa específica El tratamiento comprende la atención médica rigurosa, especialmente de los complejos factores que la agravan, alergia trastorno de la nutrición e infección La psicoterapia se encuentra indicada en tratandose de factores emocionales complejos intensos y especialmente intervención quirúrgica para ileostomía Conforme a la experiencia del autor, las irrigaciones de nisulfazole han probado ser definitivamente una terapéutica auxiliar Existe una nueva tendencia a la operación temprana, basada en el completo acuerdo del cirujano y el internista Se usa ampliamente la vagotomía en casos agudos y crónicos tempranos, aun cuando lo 2 pacientes del autor fallecieron Se encuentra definitivamente indicada la intervencion en las complicaciones de la colitis ulcerosa especialmente carcinoma

ZUSAMMENFASSUNG

Die chronische ulzerative Kolitis ist eine neurotropische Erkrankung des Dickdarms die mit mannigfachen praedisponierenden Umstaenden die den Ausbruch der Krankheit einleiten einhergeht wie zum Beispiel Infektionen Allergie Ernaehrungsstoerungen und seelische Faktoren Ihre spezifische Ursache ist noch nicht bekannt Die Therapie umfasst energische medizinische Behandlung besonders der mannigfachen komplizierenden Faktoren wie Allergie Ernaehrungsstoerung und Infektion Psychotherapie ist angezeigt zur Behandlung tiefliegender emotioneller Faktoren und besonders auch bei chirurgischen Eingriff im Hinblick auf die Duenndarmfistel Einlaufe mit Disulfazol haben sich trotz der Einwaende vieler Autoren in der Erfahrung des Verfassers in einer grossen Anzahl der Faelle von ausgesprochenem therapeutischen Wert erwiesen Es besteht neuerdings eine Neigung zu frueherem chirurgischem Eingreifen auf der Basis voelliger Uebereinstimmung zwischen dem Chirurgen und dem Internisten Die Vagotomie findet weite Anwendung in akuten und fruehen chronischen Faellen, obgleich die bei den Kranken, an denen der Verfasser interessiert war starben Der Chirurgische Eingriff ist zweifellos angezeigt in Komplikationen der geschwuerigen Dickdarmentzuendung besonders in Karzinom

RIASSUNTO

La colite cronica ulcerativa e' da considerarsi quale un disturbo neurotrofico del colon precipitato da un complesso di fattori predisponenti quali infezioni, reazioni allergiche disturbi nutritivi o psicogenici La causa specifica e' ancora ignota

La cura consiste in un rigido ed accurato controllo dei fattori predisponenti o aggravanti quali fenomeni allergici, disturbi della nutrizione, infezioni La psicoterapia e' indicata per gravi e complessi fattori emotivi e piu' particolarmente alla vigilia di un' ileosto

mia. Le irrigazioni del colon con sulfamilici sono—nonostante taluni opinioni contrarie—efficaci in una notevole percentuale di casi. Si sta tuttavia facendo sempre piu' strada la tendenza a cure operatorie piu' precoci. La vagotomia viene per esempio eseguita nei casi acuti o all'inizio di una colite cronica. L.A. ha pero' lamentato un caso di morte sopra due pazienti così operati. La chirurgia trova definitivamente il suo posto di fronte a complicazioni della colite ulcerativa, e piu' specialmente di fronte all'associazione con tumori maligni.

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The fittest time for sleep is two or three hours after supper, when as the meat is now settled at the bottom of the stomach, and 'tis good to lie down on the right side first. because at that site the liver doth rest under the stomach, not molesting any way. but heating him as a fire doth a kettle. After the first sleep 'tis not amiss to lie on the left side. that the meat may the better descend; and sometimes again on the belly, but never on the back. Seven or eight hours is a competent time for a melancholy man to rest.—*Burton*

A Clinical Evaluation of Gantrisin in the Treatment of Infections of the Urinary Tract

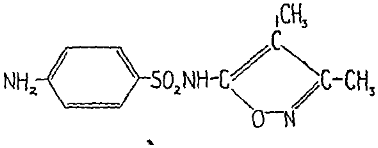
LOWRAIN E McCREA M D F A C S F I C S AND ARTHUR SCHNEEBERG M D
PHILADELPHIA

INFECTION of the urinary tract is one of the most common conditions encountered in medical practice and is of importance not only to the urologist but to the general practitioner Clinicians who treat infections long desired a therapeutic agent which would effectively combat the bacterial invaders

Owing to the great variety of organisms attacking the urinary system it has been repeatedly demonstrated that no one therapeutic agent is capable of eradicating all the different types of bacteria Nor is any one therapeutic agent capable of eradicating all strains of a given organism Much depends on the susceptibility of the organism to a given therapeutic agent and the individual patient's tolerance to the prescribed drug

Genitourinary antiseptics, *per se*, comprise one of the greatest varieties of compounds available to the physician Many of the compounds have some merit in the treatment of particular types of infection Clinically the great majority have not proved thoroughly efficacious or consistently of benefit in the eradication of the offending organisms This ineffectiveness is a handicap to the clinician in combating the gram negative organisms which are statistically the most frequently observed and are the predominant types of organism cultured in cases of urinary tract infection It has been shown that some sulfonamide derivatives have a definite therapeutic value in combating infections of this type For this reason it was our desire to investigate the therapeutic value of a new sulfonamide gantrisin, which has been recently introduced to the profession Our studies were done in a series of 50 unselected cases of infection of the urinary tract These cases were tabulated regardless of the individual bacteriologic picture, and an effort was made toward evaluation of this therapeutic agent as applied in clinical practice

Gantrisin (3 4 dimethyl 5 sulfanilamide isoxazole) is structurally formulated as shown in the accompanying illustration



It has been reported that this drug is of low toxicity and highly soluble in mediums with a pH ranging from 5 5 to 7 5, acting with equal efficacy in either an acid or an alkaline medium Obviously this characteristic greatly reduces the possibility of crystalluria and the deposition of crystals within the urinary tract The drug has been shown to possess a very rapid absorption rate, due to its great solubility *In vitro* studies show that gantrisin is highly bacteriostatic to gram negative organisms particularly Bacillus proteus, Bacillus coli and Bacillus pyocyaneus

Cultural studies of urine have shown consistent evidence that antibiotic and chemotherapeutic agents when employed for infections of the urinary tract, have limited value or no value whatever if an obstructive uropathic condition is present When evidence of infection of the urinary tract is noted, according to many investigators a complete urologic investigation is necessary to determine the existence of obstruction before treatment is inaugurated The complete genitourinary investigation should besides culture and urinalysis include such procedures as intravenous urographic study, cystoscopic investigation with collection of individual ureteral specimens and retrograde pyelographic study when indicated If obstruction is present it must be eliminated before chemotherapeutic agents can combat the infection An infection will subside rapidly after removal of the obstructive factors and administration

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The gantrisin used in this study was supplied through the courtesy of Hoffmann LaRoche Inc Nutley New Jersey

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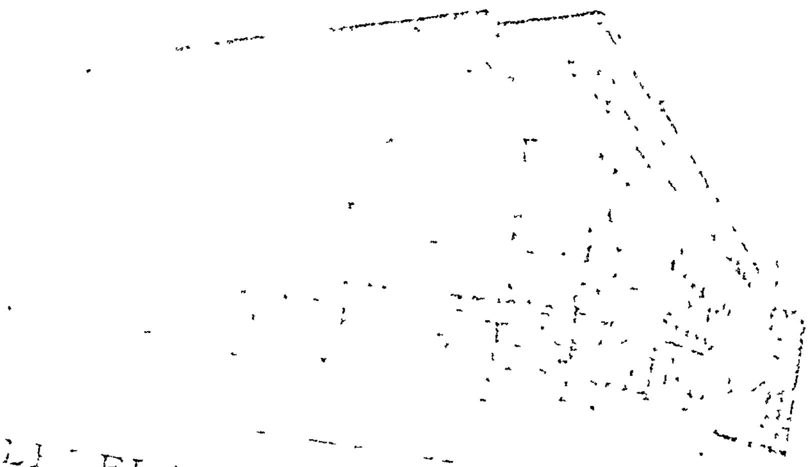

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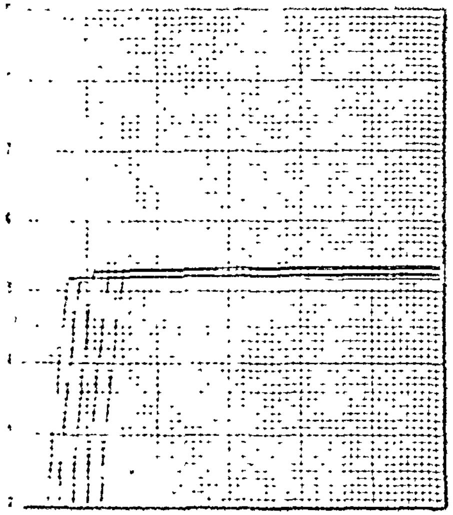

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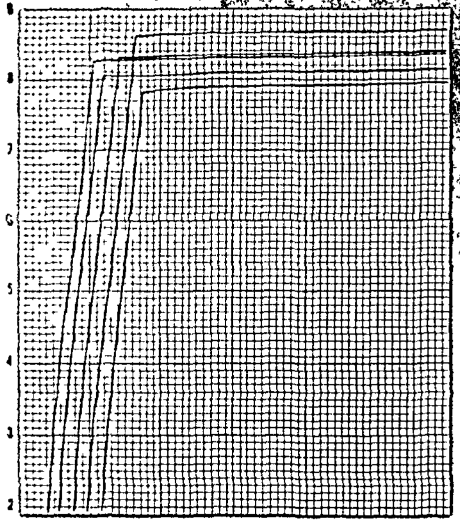

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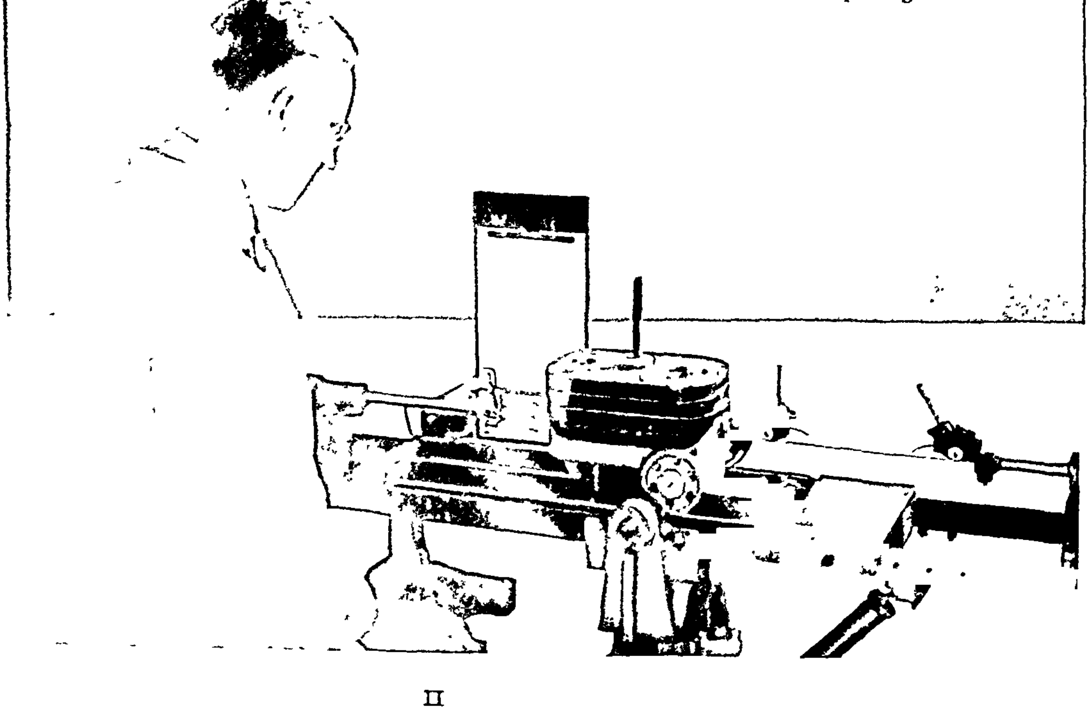

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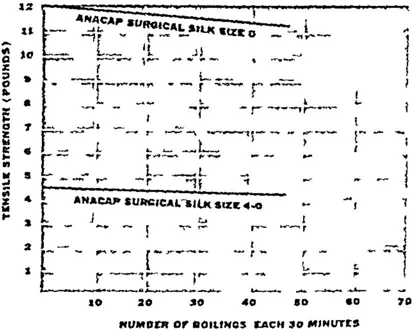

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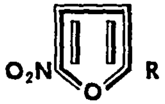

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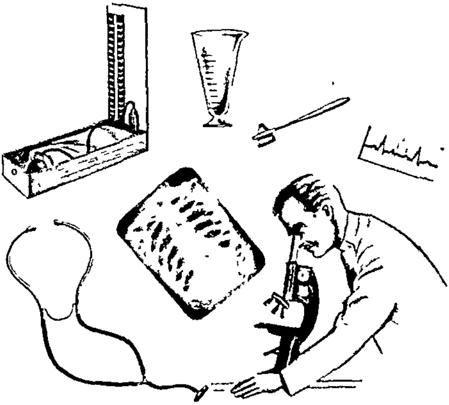

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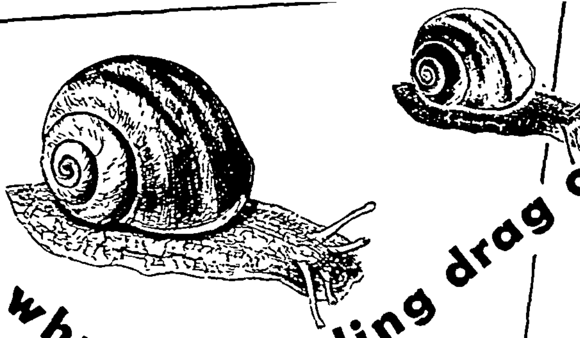

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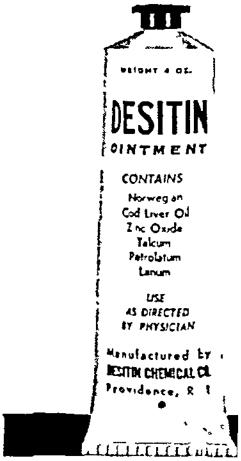

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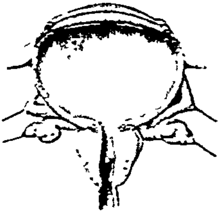

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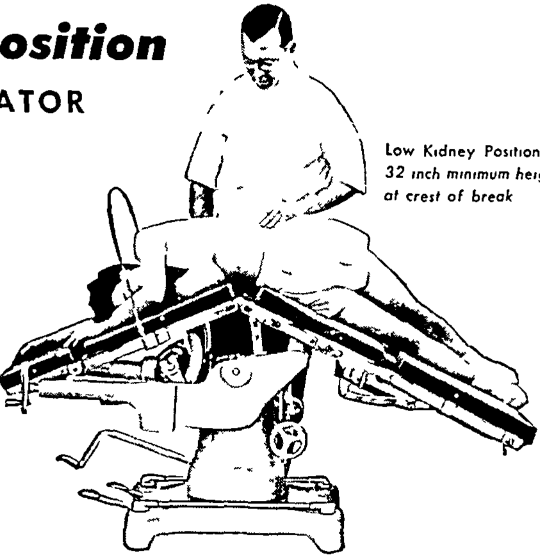

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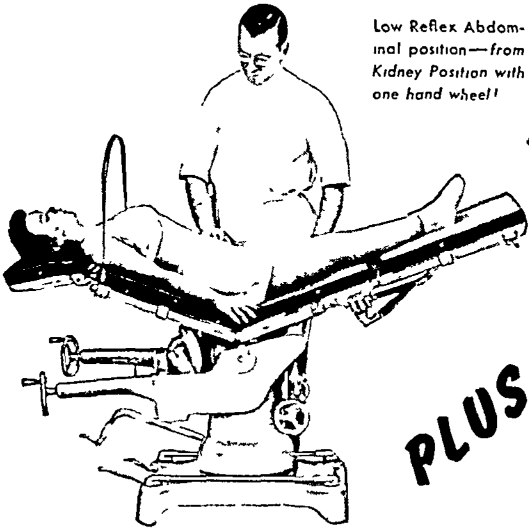

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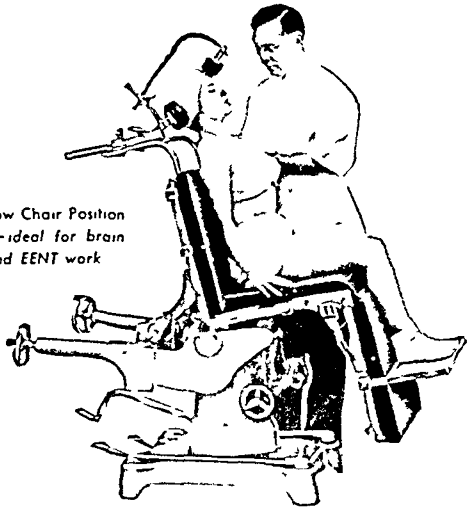

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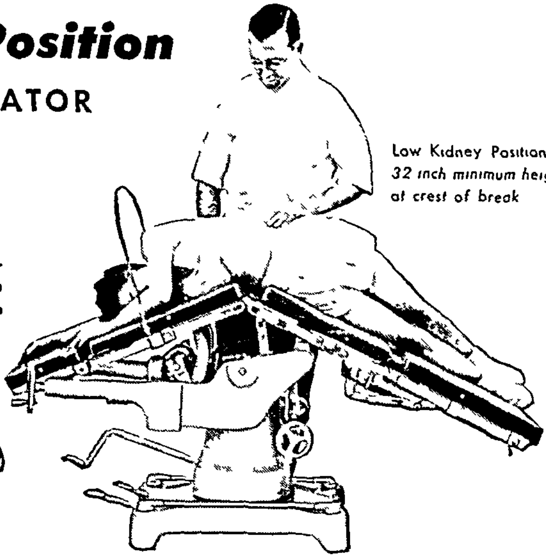

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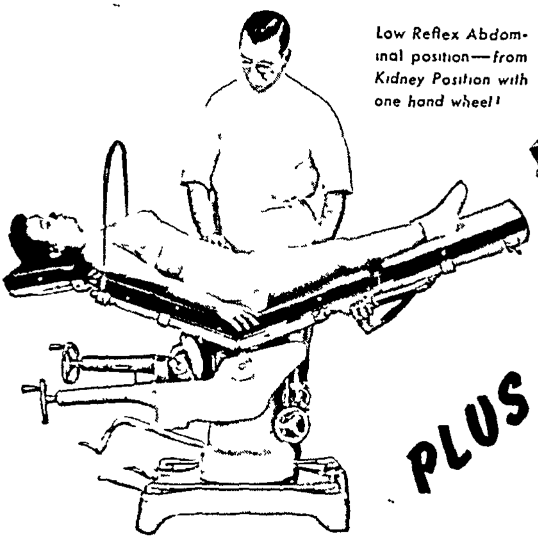

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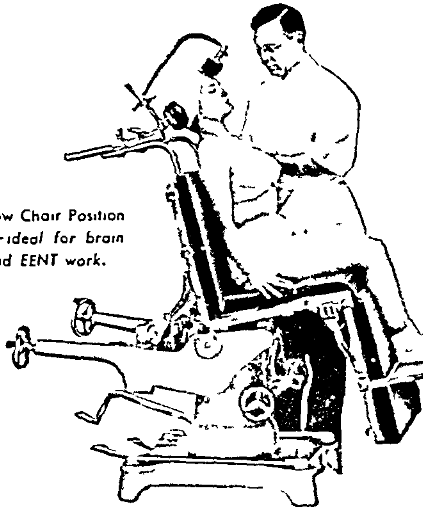

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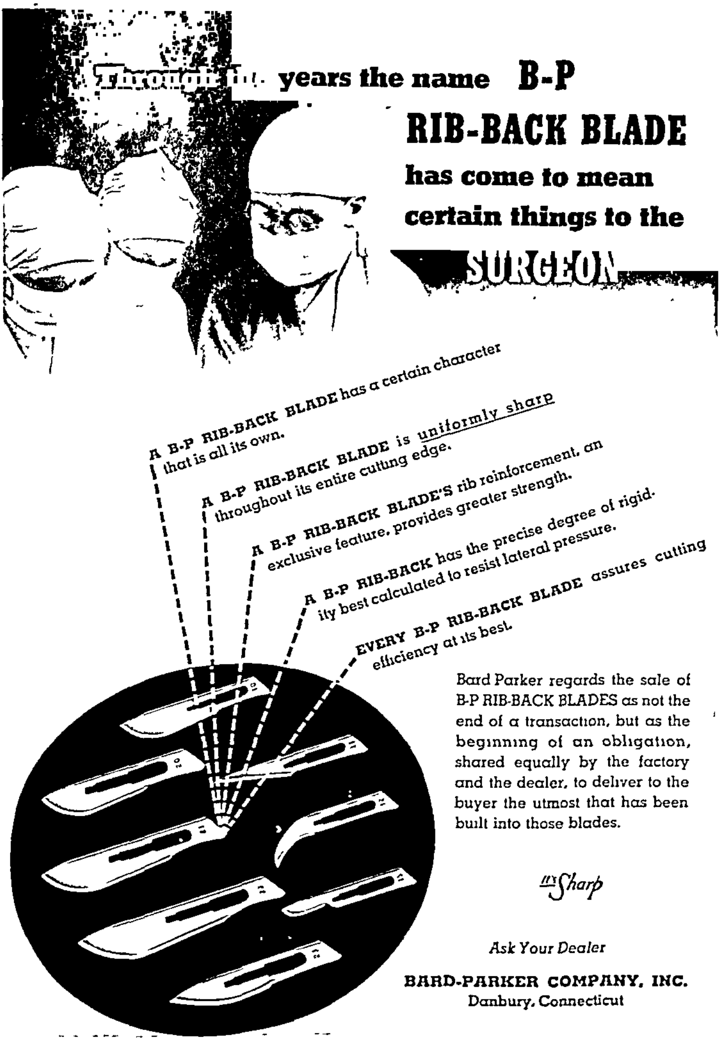

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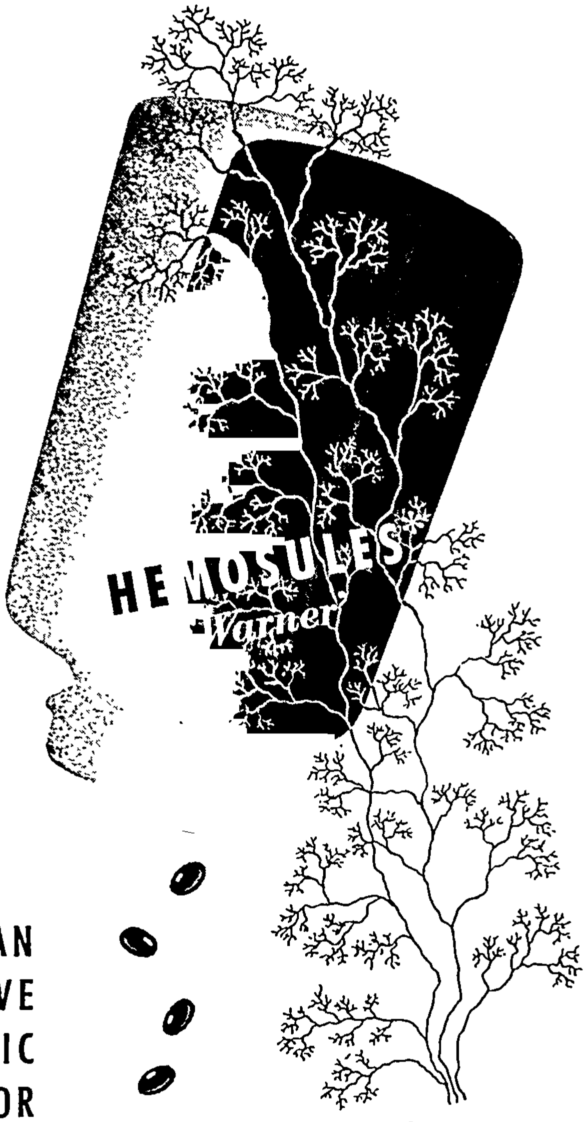

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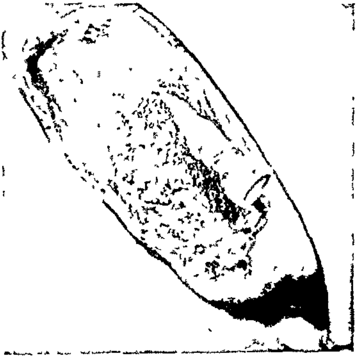

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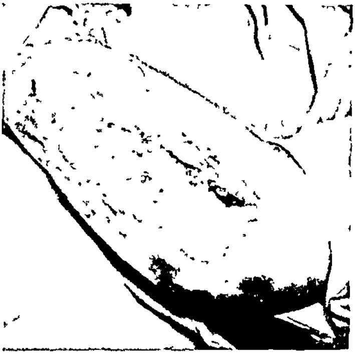

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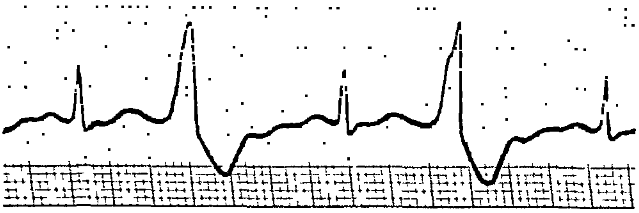
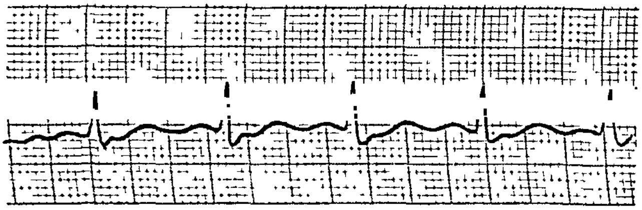
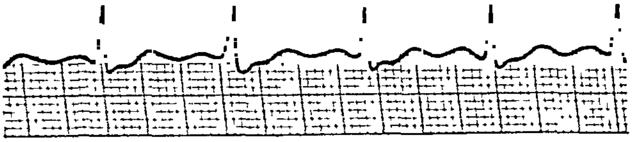


Lead II. Ventricular premature contractions (coupling) present at start of injection of 500 mg. of Pronestyl intravenously.



Lead II. One minute later Arrhythmia reverted to normal on completion of Pronestyl injection.



Lead II. Maintenance of normal rhythm.

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The Journal of the International College of Surgeons

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The Journal of the
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Vol XIV OCTOBER, 1950 No 4

Original Articles

Lumbar Hernia

MAX THOREK, M D , F I C S*
CHICAGO

LUMBAR hernia is variously known as hernia dorsalis, Petit's hernia, Grynfeltt's hernia, costoiliac hernia of Larrey, and suprailiac hernia of Huguier The areas in which it may occur are known as the Grynfeltt-Lesshaft space, the lumbocostoabdominal triangle of Grynfeltt, the spatium tendineum lumbale of Baracz, the rhombus of Lesshaft, and Krause's tetragonum lumbale

A lumbar hernia may occur anywhere in the lumbar region, which is bounded above by the twelfth rib, below by the crest of the ilium, in front by a line drawn vertically downward from the anterior extremity of the twelfth rib to the crest of the ilium, and behind by the vertebral column and the erector spinae muscles

There are two types of lumbar hernia (*a*) congenital and (*b*) acquired The acquired type may be (*a*) spontaneous or (*b*) traumatic

The recorded history of lumbar hernia as a clinical entity begins in the seventeenth century The "Treaty of Hernias" (Franco, 1561) dealt exclusively with inguinal hernias, ventral hernias of any kind were not considered It was not until the middle of the next century that authentic data became available From that time on the history of this condition falls into two main periods

In the earlier period, lumbar hernia was first suggested as a possibility by the French physicians Barbette (1672) and De Lagarenne (1726) These authors, however, had no clinical experience to report Blancard (1701) and Dolee (1703) also considered the probable occurrence of such a condition, but their suggestions were less definite than those of Barbette and De Lagarenne, and they also made no clinical contributions Budgen in 1728 described a case of what was apparently congenital lumbar hernia, but did not diagnose it as such *The first authentic case report* was made by De Garengeot in 1731 His patient, a woman, died, at autopsy a tumor "the size of a nut" was found in the right lumbar region It proved to be reducible, confirming the diagnosis of hernia

Petit, in 1733, was the first to describe the course and point of exit of lumbar hernia, and his name was given to both the hernia (Petit's hernia) and to the area of its occurrence (triangle of Petit) His description was fuller and clearer than any other then available

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Read at a meeting of the Austrian Chapter International College of Surgeons University of Vienna June 30 to July 2 1949

Submitted for publication Aug 3, 1949

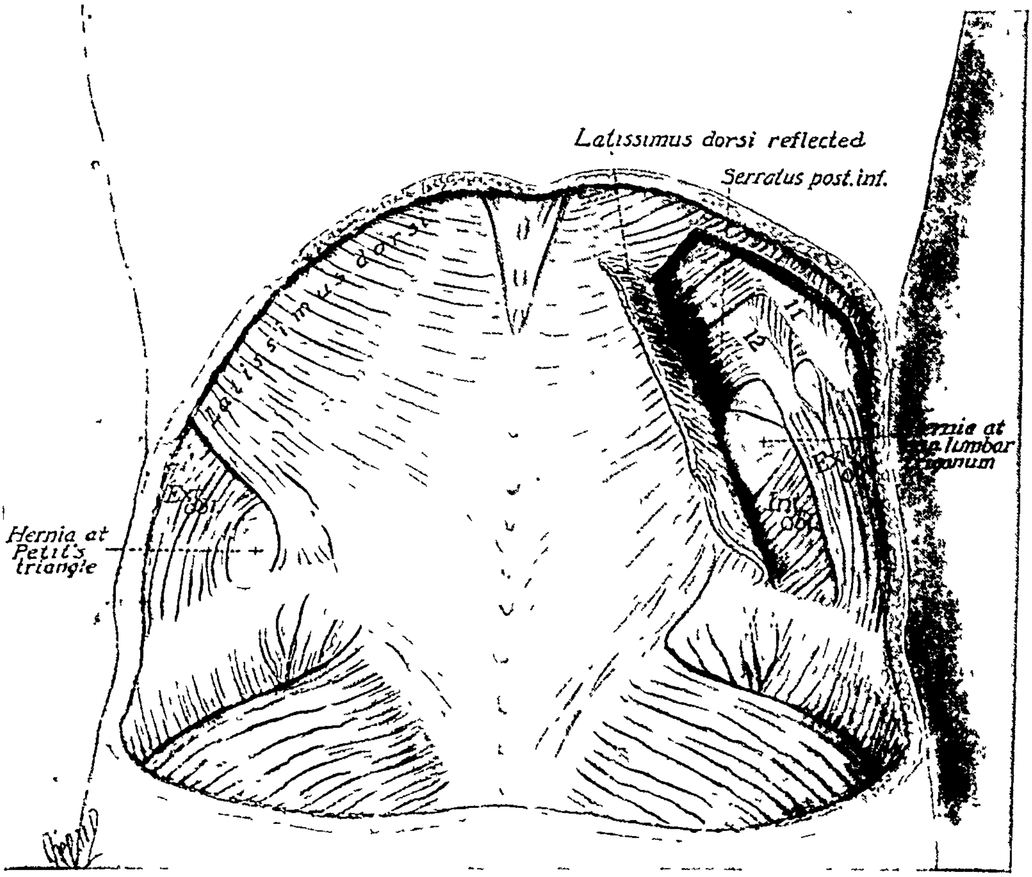
Latissimus dorsi reflected
Serratus post. inf.
Latissimus dorsi
11
12
Ext. obl.
Int. obl.
Hernia at lumbar trigonum
Hernia at Petit's triangle

Fig. 1.—The anatomic background of lumbar hernia. Petit's triangle and the superior lumbar triangle are shown in relation to the surrounding structures. (From Watson, L. F., *Hernia*, C. V. Mosby, St. Louis.)

The area in which he located the hernia was the inferior lumbar triangle.

In 1750 Ravaton published the first report of a strangulated lumbar hernia with operation and recovery. His patient, a pregnant woman, had a normal delivery. In 1767 Heuermann reported a case of strangulated hernia with spontaneous cure through formation of an artificial anus. In the following year Balin described a lumbar hernia the point of exit of which was above the ilium and behind the external oblique muscle.

Of these earliest authorities, Petit, by the care and accuracy of his observations, achieved a precedence which has been widely questioned. Larrey cited the writings of Barbette to demonstrate the latter's priority (Macready, *Lancet* 1890), and Jeannel disputed the designation of the inferior lumbar trigonum by Petit's name, pointing out that Dolee, De Garengeot, Ravaton and Balin have an equal claim. Petit himself disclaimed originality.

Various further contributions to the literature on lumbar hernia (see table) were made by Decaisne (1838), Verdier (1840), Colles (1857), Nélaton, (1858-59), Chaplain (1861), Marmisse (1862), Schraube (1863) and Kingdon (1864).

The second period may be said to begin with Grynfeltt, who in 1866 described hernia of the superior lumbar triangle as distinguished from the inferior lumbar triangle of Petit. This area became known as the lumbocostoabdominal triangle of Grynfeltt. Larrey, in 1869, referred to the condition as costoiliac hernia. In 1870 Lesshaft confirmed Grynfeltt's observations, calling the Grynfeltt area the "superior lumbar trigonum" or "rhombus lumbalis."

Rigyon in 1872 reported 2 cases. In 1879

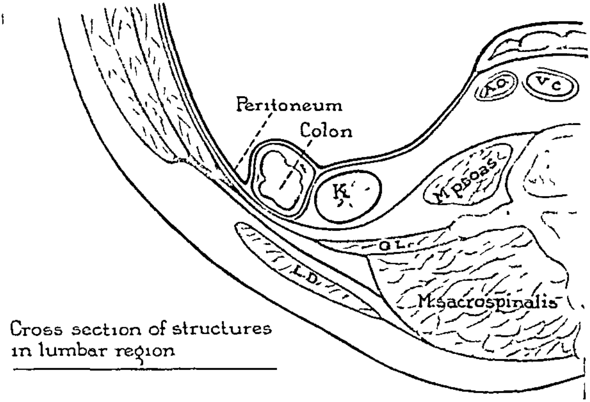

Fig 2.—Artist's diagrammatic representation of cross section of structures concerned in lumbar hernia (Thorek, Max *Modern Surgical Technic*, Lippincott 1930)

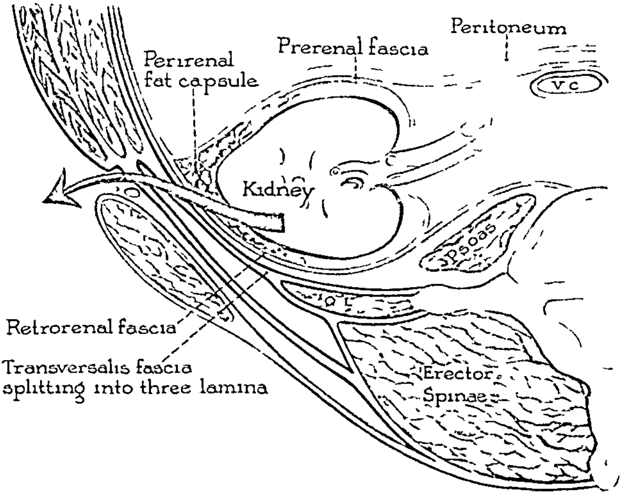

Fig 3.—Lumbar hernia, showing the route of a herniated kidney (Thorek, Max *Surgical Technic*, Lippincott 1930)

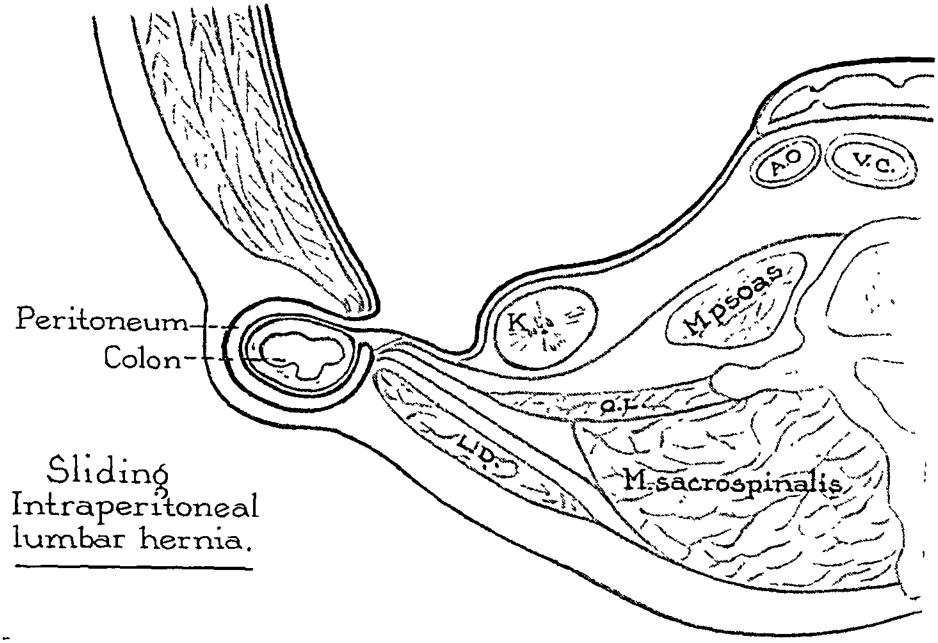

Fig. 6.—Structures concerned in sliding intraperitoneal lumbar hernia. (Thorek, Max: *Modern Surgical Technic*, Lippincott 1950.)

scent of the hernia. The effect of strain or trauma is sometimes much delayed; this is frequently observed in cases of hernia due to surgical trauma.

Thus, in the literature on lumbar hernia, classification is based on the presumed or actual etiologic factor responsible for the hernia. Such classification is not of much aid in operations for lumbar hernia. Moreover, in discussing classification of various types of lumbar hernia a great deal of controversy has arisen. There are those who state categorically that lumbar hernia has a sac. There are others who maintain just as emphatically that lumbar hernia has no sac.

To strike a happy medium, I propose the following classification, based on anatomic desiderata:

1. *Extraperitoneal Lumbar Hernia* (Fig. 4).—The term "extraperitoneal" applies to herniations of the viscera through any one of the lumbar spaces, in which the escaped contents have no peritoneal covering whatever.

2. *Paraperitoneal Lumbar Hernia* (Fig. 5).—This term describes the herniation of viscera or parts thereof accompanied by an adherent portion of the peritoneum following the descent of the hernia. (Most hernias of the paraperitoneal type are thickly covered with fat.)

3. *Complete Intraperitoneal (Sliding) Lumbar Hernia* (Fig. 6).—In this type the periotoneum not only accompanies the hernia in its descent but covers it entirely, forming a true peritoneal sac.

As to its incidence, lumbar hernias of all types, occur more frequently in the male than in the female. No age group is exempt, but middle-aged persons predominate. There seems to be some predilection for the left side.

No great difficulty is encountered in diagnosis of most lumbar hernias. The palpable tumor is the most prominent sign. It may vary in size from an inch to a foot (2.5 to 30 cm.) in diameter. Its shape tends to be round but may approach the oval. The smaller tumors are easier to locate. If bowel is implicated, reduction is likely to be accompanied by a distinct gurgling sound, while coughing at once reveals the hernial impulse and percussion yields a tympanitic sound.

Subjective symptoms may be few or absent; in some cases the patient may suffer from colicky pain, vomiting, fatigue, a dragged-down feeling, tenderness on pressure or pain in the back. In a great many cases the condition is asymptomatic, the hernia attaining a

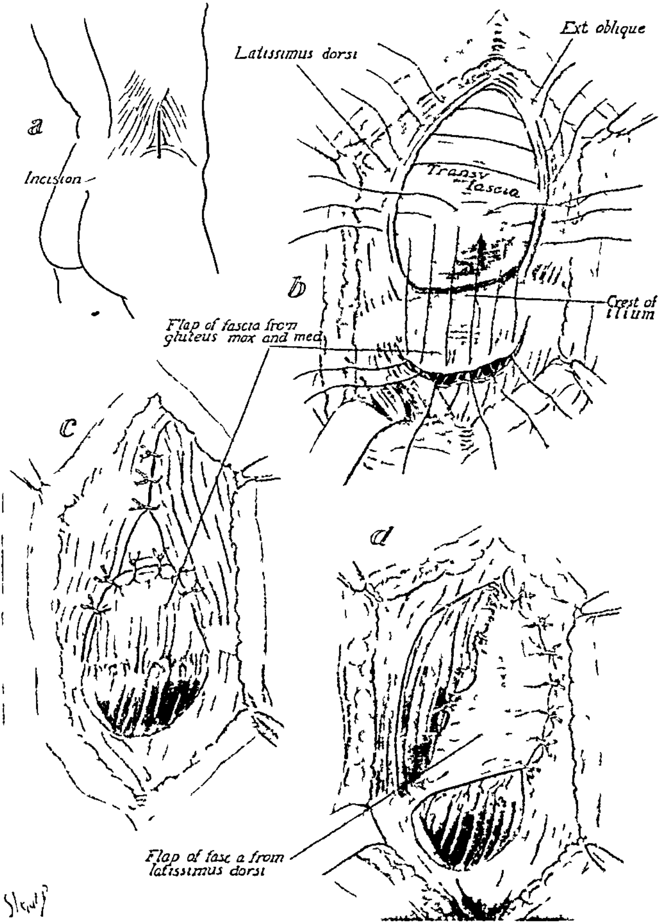
a
Incision
Latissimus dorsi
Ext oblique
Transv fascia
b
Crest of ilium
Flap of fascia from gluteus max and med
c
d
Flap of fascia from latissimus dorsi

Fig. [illegible]—Dowd's operation for lumbar hernia. The line of incision is shown at point a. At point b a flap of fascia lata and aponeurosis of the gluteus maximus and medius muscles is turned up and sutured to the lumbar fascia and the external oblique and latissimus dorsi muscles. After the flaps are sutured a gap still remains (c). This gap is closed (d) with a flap of fascia from the latissimus dorsi. (From Watson, L. F., *Hernia*, C. V. Mosby, St. Louis.)

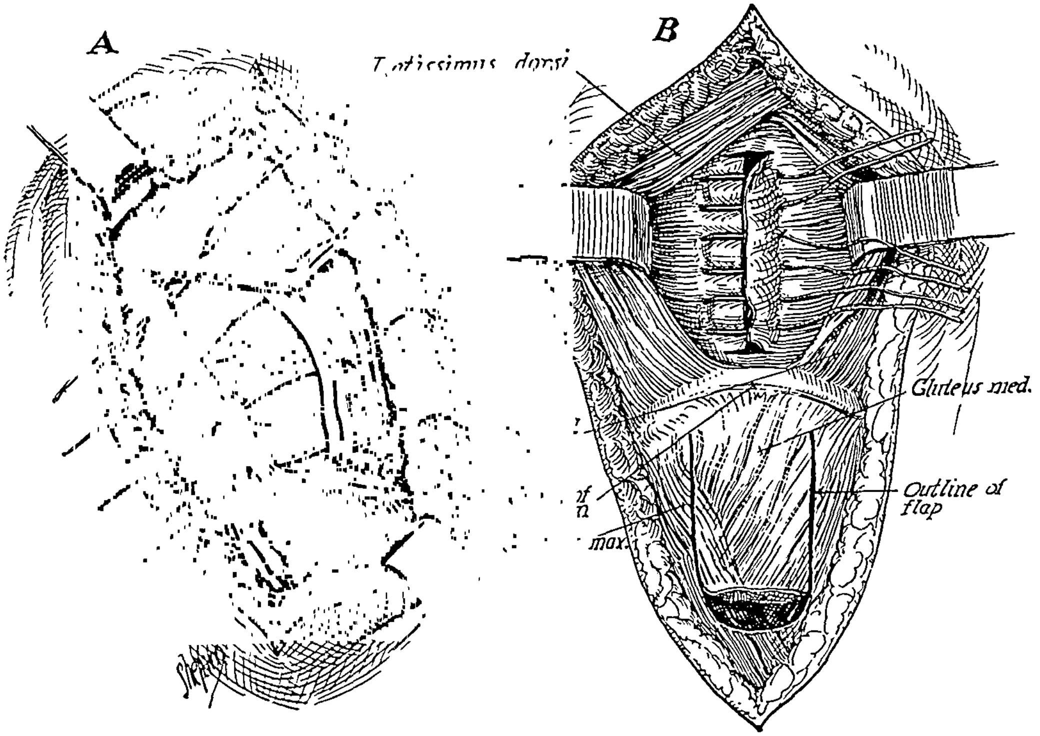

Fig. 8.—Operation for lumbar hernia. *A*, Rishmiller's method of closing the opening by a flap obtained by splitting the latissimus dorsi and overlapping the superficial fascia. *B*, S. Warbasse's method of overlapping flaps of transversalis fascia and reinforcing with a flap turned up from the fascia below the crest of the ilium. (From Watson, L. F., *Hernia*, C. V. Mosby, St. Louis).

large size before the patient becomes fully aware of its presence. Fatty hernia may present diagnostic problems, since even a reducible fatty hernia may be mistaken for an enterocele.

Diagnostic difficulties are chiefly associated with irreducible or strangulated hernia. Strangulation by constriction is comparatively rare in lumbar hernia. It is most frequent in the spontaneous type and is apt to be due to volvulus or to constriction of the neck of the sac.

Lumbar hernia must be distinguished from (*a*) abscess, (*b*) lipoma, (*c*) fibroma, (*d*) muscle hernia, (*e*) hematoma and (*f*) Pott's disease. None of these latter conditions will produce subjective symptoms characteristic of intestinal obstruction or strangulation, and they can all be distinguished from reducible lumbar hernia by the fact that the swelling is not reducible by manipulation and is not affected by coughing. No hernial orifice can be palpated.

In most cases of lumbar hernia the prognosis is favorable.

TREATMENT

The treatment of lumbar hernia may be mechanical. Being reducible in nearly all cases, the protrusion can sometimes be controlled by an appropriate truss or a bandage. This, however, is not satisfactory if the hernia increases in size, as it is likely to do in children. Radical surgical intervention is always the treatment of choice except in the presence of definite contraindications offered by the age and general condition of the patient.

The operative technic depends upon the type of hernia encountered. An incision is made over the center of the tumor, beginning just below the twelfth rib and extending downward to the iliac crest. The incision should be long enough for full exposure of all anatomic parts and the identification of structures. The sac, if present, should be located; it is never adherent to the skin and as a rule is covered with fat not muscle If there is any difficulty in finding it dissection should proceed cautiously, there may be no sac but *only a mass of subperitoneal fat When the* hernia consists of subperitoneal fat alone (adipocele) the pedicle should be lighted and the tumor excised The edges of the aponeurosis should then be overlapped and the opening closed with interrupted or mattress sutures of chromic catgut

A small hernial opening can be closed with purse string sutures and overlapping of the fascia as in the closure of small ventral hernias Inversion of the sac if small without removal, will often suffice If the hernia is large the sac should always be resected

A large hernial opening is difficult to close Often it is possible however to detach a portion of the latissimus dorsi or the external oblique *muscle bring it over the opening and* suture it in place An excellent method is to overlap flaps of the transversalis fascia (Watson) Longer flaps can be secured if the flap incision is crossed at each end by a short transverse incision In the presence of a very large gap, a flap of fascia may be turned up from below the crest of the ilium (Dowd, Rishmuller, and Warbasse Figs 7 and 8) The muscles are then brought together, the superficial fascia sutured and the wound closed If the opening is large I have used tantalum mesh with success

Strangulated lumbar hernia calls for immediate surgical intervention the technic of which is similar to that for strangulation located elsewhere

REPORT OF CASES

CASE 1 *Incarcerated Left Paraperitoneal Lumbar Hernia*—G W, a white man aged 69, was admitted to the American Hospital with symptoms of intestinal obstruction and urinary disturbance His general condition was good The history revealed that he had sustained an injury to the back many years before

Examination revealed a mass in the left lumbar region, about the size of a fist and tender to the touch (Fig 9 left) The mass extended to the front and could not be reduced There was much tenderness in the left upper quadrant extending downward The diagnosis was possible tuberculous abscess with local peritonitis or an incarcerated or strangulated lumbar hernia

Operation was performed on Jan 29, 1949, pontocaine with dextrose being employed for anesthesia The patient was placed in the kidney position A longitudinal incision was made posterolaterally over the mass, extending to the iliac crest Wide dissection of skin flaps was made, and the border lines of the lumbar space were identified A mass the size of a small fist was found protruding through the Grynfeltt Lesshaft space The hernial opening was large, about 1¾ inches (3 3 cm) across, and circular The protruding mass was dissected and found to consist of components of Gerota's capsule (pararenal fascia), giving the impression of a pseudosac firmly attached below to the upper pole of the kidney, which herniated through the opening into the lumbar space It was then evident that a paraperitoneal hernia was present

The mass was resected, the kidney reposited and the muscular and fascial components of the large space repaired with interrupted chromic catgut sutures A quadrilateral tantalum wire mesh re*inforcement, 2½ inches (6 2 cm) square and* corresponding in size to the original hernial opening was sutured into place with No 24 cotton sutures over the repaired external oblique muscle The subcutaneous fascia and skin were closed over with interrupted No 24 cotton sutures

The patient made an uneventful recovery The sutures were removed on the twelfth day, and the patient left the hospital

The postoperative diagnosis was incarcerated left paraperitoneal lumbar hernia consisting of the components of Gerota's capsule and kidney

Nine months later a checkup roentgenogram showed no irritation The man had no pain and was in good condition, and the tantalum mesh implant was in position (Fig 9 right)

CASE 2 *Left Lumbar Hernia (Adipocele)*—F S, a white man aged 41, entered the hospital *with a history of injury over the left lumbar area* at the age of 16 In 1947, while pushing a car, he fell against the bumper and immediately felt sharp pain along the last rib on the left side and in the left lumbar region Soon afterward he noticed that when he coughed, a mass would protrude from the left lumbar area For three months prior to admission he had felt gnawing pain during exercise which was reflected along the posterior aspect of the thigh He experienced this same pain in cold weather

Examination showed a small palpable mass in about the middle of the left lumbar region, measuring approximately 1 by 1 cm The mass became more prominent on coughing

Diagnosis was made of a possible fibroneuroma or a possible lumbar hernia

Operation was performed on Feb 11 1949, pontocaine with dextrose being used for anesthesia

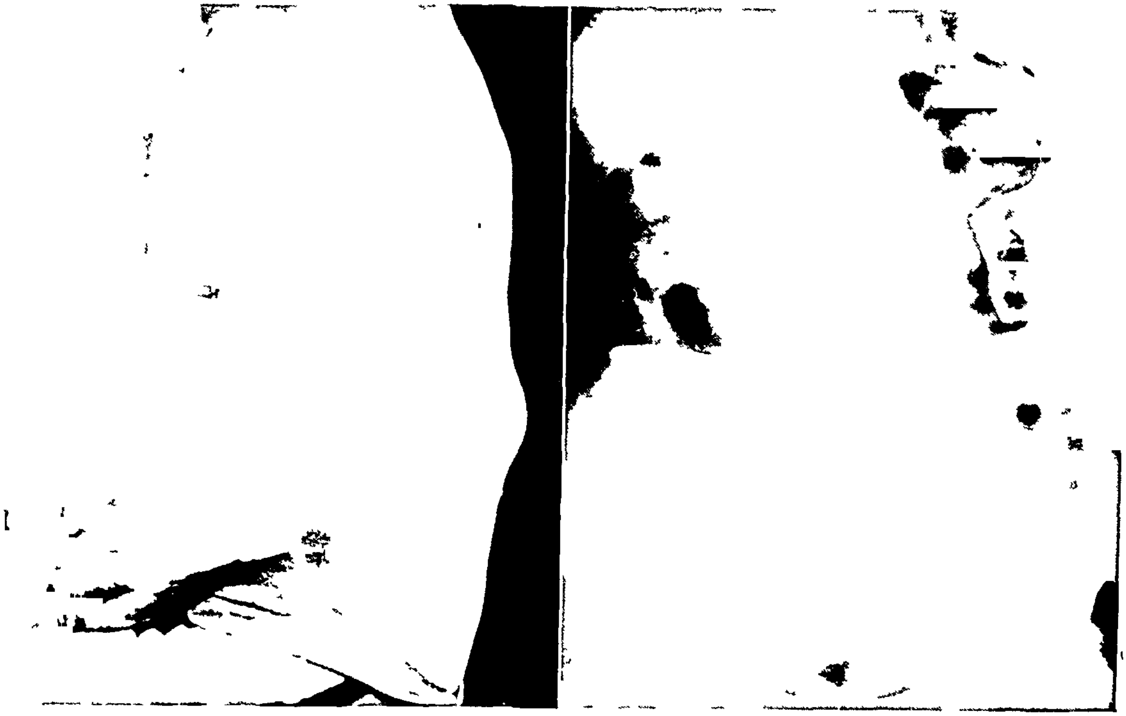

Fig. 9.—Paraperitoneal lumbar hernia *Left,* before operation; *right,* nine months after operation, showing tantalum reinforcement in place (Thorek, Max *Modern Surgical Technic,* Lippincott 1950.)

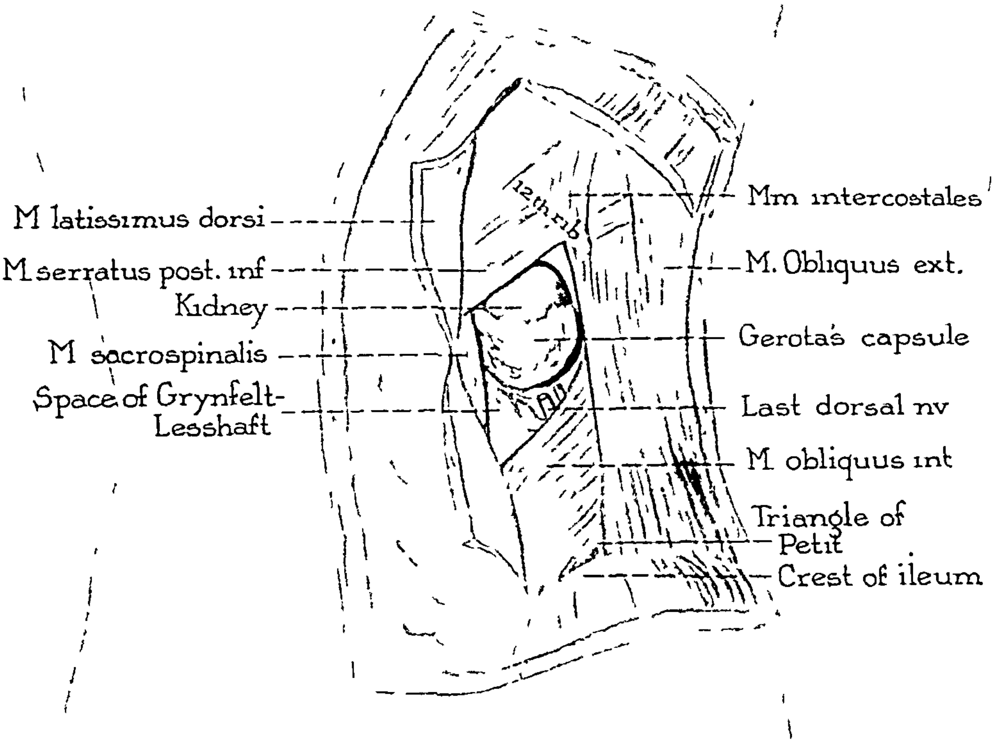

Fig 10—Paraperitoneal lumbar hernia through the space of Grynfelt Lesshaft, consisting of Gerota's capsule and kidney. (Thorek, Max *Modern Surgical Technic,* Lippincott 1950.)

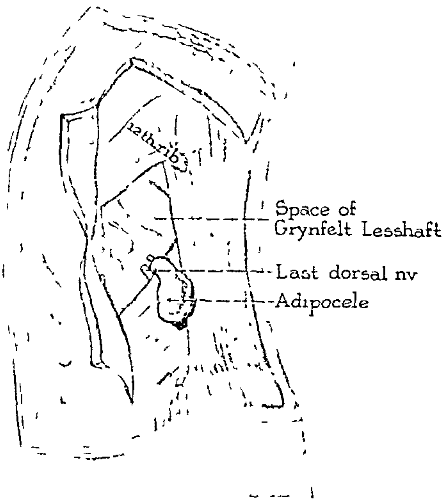

Fig 11 —Lumbar hernia in the space of Grynfelt Lesshaft, consisting of an adipocele (Thorek, Max *Modern Surgical Technic*, Lippincott 1950)

The left lumbar space was dissected free A yellowish protrusion the size of a walnut was observed (Fig 10) Further dissection revealed that the mass emerged from an opening in the posterior layer of lumbodorsal fascia and was accompanied by one of the lower lumbar arteries and its nerve. The tumor was removed and the blood vessel ligated. Repair of the defect was made by overlapping the adjacent fascial structures The skin was closed in the usual manner with interrupted No 24 cotton sutures Primary union was effected

The patient was ambulatory the second day and left the hospital the fifth day A month later he reported that the pains along the thigh and in the back had completely ceased since the removal of the tumor

The postoperative diagnosis was left lumbar extraperitoneal hernia (adipocele; Fig 11).

SUMMARY

Lumbar hernia, which may occur at any point in the lumbar region, may be either congenital or acquired If congenital, it is due to defective prenatal development Acquired lumbar hernia may be either spontaneous or traumatic If spontaneous, it is probably due to a delayed effect of some prenatal weakness, if traumatic, to injury or strain

I have classified lumbar hernia as *(1) extraperitoneal:* herniations of the viscera through either lumbar space, in which the escaped contents have no peritoneal covering, (2) *paraperitoneal:* herniation of viscera or parts thereof, accompanied by an adherent portion of the peritoneum following the descent of the hernia, and (3) *complete intraperitoneal (sliding)* lumbar hernia with the peritoneum accompanying its descent and covering it entirely, forming a true peritoneal sac

Lumbar hernia may be either unilateral or bilateral, the unilateral type being more frequent in the acquired form It occurs more often in the male than in the female and shows a predilection for the left side of the body There is no age limit in either direction, but the highest incidence is among persons of middle age

The treatment of choice is radical operation unless definitely contraindicated The prognosis is generally favorable.

Cases of Lumbar Hernia Reported in Literature

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Garengeot	1731		F	Wrong step	Between rt. iliac crest and false ribs	Strangulated	Bowel		Patient died
Petit	1733	Middle	F	Pregnancy	Between iliac crest and false ribs (left)	Strangulated		Operation (?)	
Ravaton	1738	Middle	F	Pregnancy, repeated vomiting	Left flank	Strangulated	Bowel, epiploon	Operation	Patient cured
LeMaire (LaChausse)	1759	Middle	M	Other hernial protrusions present	Left and right lumbar regions				
Desault	1791	Young	M	Fall from 4th floor	Lateral abdominal wall				
Monro	1802	6 mo.		Congenital	Under false ribs (left and right)	Reducible, not retainable	Kidneys		Patient died
Lassus	1806		M	Blow by steering wheel	Right lateral and inferior parts of abdomen	Reducible			
Richerand	1815		M	Scar following wound	Right flank	Reducible			
Cloquet	1819	65	M	Effort in lifting weight	Between rt. iliac crest and 12th rib	Strangulated		Truss	
Decaisne	1839	6		Fall of 30 feet	Petit's triangle (left)	Reducible	Bowel		Patient died from other cause
Verdier	1840		M	Fall on rt. flank	Between rt. iliac crest and 12th rib	Reducible		Truss	

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Van Hengel	1818		F	Acute abscess fall 36 yrs before	Under false ribs (left)		Bowel	Abscess opened spontaneously	
Colles	1857	12 mo	F	Congenital with scoliosis	Left flank	Reducible			
Nelaton	1857		M	Blow by buffer	Left flank	Reducible			
Marquez	1859		F	Effort many pregnancies	Between l iliac crest and 12th rib	Strangulated	Bowel epiploon		
Chapplain	1861	60	M	Blow by car (*thrown against* wall)	Between rt iliac crest and 12th rib	Reducible	Bowel epiploon		Twelfth rib highly movable
Marmisse	1862	72	F	Obesity (?)	Between l iliac crest and false ribs	Never reduced	Bowel epiploon		Observations made on cadaver
Schraube	1863	31	M	Impact on stone	Between l iliac crest and 12th rib				
Basset	1864	18	M	Familial	Posterior part of left flank	Reducible	Epiploon (?)	Truss	
Grynfeltt	1866	70	M	Violent blow on flank	Posterior part of left flank	Reducible strangulations	Bowel	Truss	
Sistach	1867	46	M	Scar following hematoma	Left flank	Reducible		Truss	
Hardy	1869	30	F	Necrosis of iliac bones effort due to constipation	Over iliac crest (left)	Reducible	Bowel		

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Triponel	1869		F	Effort	Right lumbar region	Strangulated, reduced		Truss	
Larrey	1869	30	M	Blow by gun, abscess, scar	Under 12th rib	Strangulated, reduced	Bowel, epiploon		
Auzias-Turenne (Larrey)	1869	Old	F		Left side	Reducible	Omentum		
Dolbeau (Larrey)	1869	Adult	F		Lumbar region			Operation on abscess	
Levy	1869	Old	F		Petit triangle (left)	Reducible			
Duplay (Rigodin)	1872	68	F	Kick, abscess, scar	Left lumbar region	Reducible strangulations	Bowel	Truss	Patient died from strangulation
Broca (Rigodin)	1872	72	M	Impact of lumbar region against staircase	Grynfeltt space (left)	Incompletely reducible	Epiploon	Truss	
Apperson	1873	63	F	Many pregnancies	Right lumbar region	Reducible strangulations		Truss	
Campbell	1874	4	M	Scar of spinal abscess	Between l iliac crest and 12th rib	Reducible	Bowel		
Coze	1874	Adult	M	Effort in riding	Apex of Petit triangle (right)	Reducible, not retainable			
Coze	1874	Adult	M	Effort in riding	Petit triangle (right)	Reducible	Colon	Truss	
Braun	1879	33	M	Spondylitic abscess not open, double	Petit triangle (left)	Reducible	Bowel		Observations made at autopsy

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Braun	1879	24	M	Necrosis of external part of iliac crest	Over iliac crest (right)	Reducible	Colon		
Monro Jr	1879	Adult	M	Effort in lifting cask of sugar	Near 1st lumbar vertebra (right and left)				
Cornier	1880	70	F		Between iliac crest and false ribs (right)	Reducible			
Wolff	1880	24	M	Absence of part of iliac bone	Petit triangle	Reducible	Colon		
Starcke	1880			Incision of lumbar abscess					
Burow	1880								
Bayer	1880	6	F	Scar from acute abscess	Right Grynfeltt space	Reducible			
Gosselin	1881	55	M	Lumbar scoliosis	Petit triangle (left)	Reducible	Bowel		
Owen	1888	6	F	Scar from abscess	Right lumbar region		Bowel	Operation	Patient cured
Dumesnil Brunon	1889	61	M	Spontaneous	Left lumbar region	Reducible	Bowel	Truss	
Gage	1889	17	M	Congenital	Left flank	Reducible			
Hume	1889	68	M	Spontaneous (?)	Left Grynfeltt space	Reducible strangulated	Bowel	Operation	Patient died

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Hutchinson	1889	65	M	Spontaneous (?)	Left Grynfeltt space (Hartmann fissure)		Bowel		Observations made on cadaver
Kingdon (Macready)	1890	64	M	Effort in lifting heavy weight	Petit triangle (left)	Reducible	Omentum		
Wolff (Lieber)	1890	3	M	Spinal abscess	Petit triangle				
Macready	1890	54	M		Petit triangle (left)	Not reducible	Adipocele (?)		Patient cured
Macready	1890	30	M	Spontaneous (?)	Petit triangle (right)	Reducible			
Macready	1890	16	M	Congenital	Below and in front of 12th rib (right)			Truss	Patient cured
Macready (Chaplin)	1890	17	M	Congenital	Lumboventral region (right and left)	Reducible			
Mastin	1890	6	M	Congenital	Left lumbar region	Reducible			
Smith (Macready)	1890		M	Congenital					
Wyss	1892	10 mo.	M	Congenital	Right lumboventral region				Observations made at autopsy
Shepherd	1892	60	M		Grynfeltt space (Hartmann fissure)		Fat		Observations made on cadaver
Tucker	1893	35	F	Pregnancy	Rt. flank groin	Not retainable	Intestine, stomach	Operation	Patient cured

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Starr	1894		M	Lifting heavy weight	Between iliac crest and last rib	Reducible			
Berger	1895	Young	F	Congenital	Lumbar region (right and left)				
Berger	1895		F	Scoliosis	Between iliac crest and 12th rib				
Coley	1895	21 mo	M	Congenital	Left triangular space	Reducible		Operation	
Galloway	1895	Adult	M	Spontaneous	Left flank				
Raymond	1897	35	M	Scar following wound	Petit triangle (left)	Reducible	Fat	Operation	Patient cured
Russell	1898	Young	M	Congenital					
Bestendonk	1899	20	M	Kyphosis of dorsolumbar vertebrae, previous abscess	Under 12th rib (right)	Reducible	Ascending colon, fat	Operation	Patient cured
Schenk	1900	Newborn	M	Congenital	Grynfeltt space (right)	Reducible			
Morestin	1901				Sacrolumbar aponeurosis		Fat		Observations made on cadaver
Desmoulin	1901	55	M	Effort in lifting weight	Grynfeltt space (right)	Reducible	Lipoma	Operation	
Nachod	1901	Newborn	M	Congenital	Abdominal wall (right)	Reducible			

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Borchardt	1901	15 mo.	M	Congenital	Lumboventral region (left)	Reducible	Bowel		Observations made at autopsy
Zentner	1901	6	F	Spontaneous (cough, effort)	Lesshaft triangle (left)	Reducible	Omentum	Operation	Patient cured
Hein	1902				Between 12th rib and iliac crest		Fat		
Webb Jones	1902	45	M	Spontaneous (?)	Petit triangle (right)	Reducible	Colon	Operation	Patient cured
Baracz	1902	2½	F	Congenital	Between costal arch and iliac crest (right)	Reducible		Truss	
Baracz	1902	11	F	Effort in lifting table	Under left 12th rib (Grynfeltt space)	Reducible	Bowel	Truss	Patient cured
Baracz	1902	16	M	Blow by iron shaft	Under left 12th rib (Grynfeltt space)	Reducible	Bowel		
Baracz	1902	62	M	Heavy work	Under left 12th rib (Grynfeltt space)	Not reducible	Fatty hernia (?)		
Baracz	1902	13	M	Scoliosis	Under left 12th rib (Grynfeltt space)	Reducible			
Jeannel	1902	4 mo.	M	Congenital	Right side	Reducible		Operation	Patient cured
Gaillac	1903	Adult	M	Effort in jumping	Lumbar region	Reducible			

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Tereschenkow	1903	17	M	Spontaneous (?)	Under 12th rib (Grynfeltt space) (left and right)	Reducible	Fat	Operation	Patient cured
Küttner	1905				Under 12th rib (Grynfeltt space)				
Lejars	1905	65	M		Petit triangle (left)	Strangulated	Colon	Operation	
Namba	1907	1 mo	M	Congenital	Between 12th rib and iliac crest (left)		Colon kidney		Observations made on cadavar
Dowd	1907	3½	M	Congenital	Petit triangle (right)		Appendix	Operation	
Ruppanner	1908	48	M	Effort in lifting heavy table	Under last rib (left)		Fat	Operation	
Hurley	1908	4	M	Attack of whooping cough	Below 12th rib	Reducible	Part of ascending colon (?)	Tight girdle with pad over hernia	
Hammond	1909	38	F	Many pregnancies	Right iliocostal space, from iliac crest to ribs	Irreducible owing to adhesions		Operation	Patient cured
Bertrand	1909		M	Kyphosis of last thoracic vertebra					
Saxl	1909			Spondylitic abscess					
Franck	1910	17	M	Direct trauma incised hematoma	Lumbar region (left)			Truss	

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Anisimow	1911	7	M	Spondylitic abscess	Lumbar region (right)			Operation	Patient cured
Claeys	1911	2	F	Spondylitic abscess, kyphosis	Above iliac crest (left)	Reducible	Fat, colon	Operation	Patient cured
Berdjajew	1911	24	M		Grynfeltt space (right)		Epiploon, prehernial lipoma	Operation	Patient cured
Duncker	1911	54	M	Effort in lifting weight	Below left 12th rib	Reducible	Fat	Operation	Patient cured
Friedenthal	1911	45	F	Effort during falling, repeated pregnancies	Below left 12th rib	Strangulated, reducible			
Secousse, Lasserie	1913	Adult	M	Effort in carrying weight	Left lumbar region	Reducible	Bowel (?)		
Preuss Kriegsmin	1913	Adult	M		Petit triangle			Operation	Patient cured
Campora	1915	61	M	Effort	Grynfeltt space (left)	Reducible	Fat	Operation	Patient cured
Goodman, Speese	1916	58	M	Effort	Grynfeltt space (left)	Reducible	Bowel		
Rishmiller	1917	31	M	Crushing of thighs by train wheel, extensive deep injury over left iliac crest, 3 years before	Petit triangle (left)		Piece of bone	Operation	Patient cured
Turner	1917	55	M	Fall	Petit's triangle (left)	Reducible	Loop of bowel, no sac	Operation	Patient cured

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Hancock	1920	40	M	Being thrown from railroad car	Petit's triangle (left)	Reducible		Operation	Condition recurred
Fuld	1920	64	M		Lumbo-abdominal region (left)	Reducible strangulations	Epiploon	Truss	
Fuld	1920	65	F		Over iliac crest	Reducible, strangulations	Epiploon	Truss	
Goebel	1920	54	F	Effort in falling on side	Grynfeltt space (right)				
[illegible]	1921	61	M		Grynfeltt space (left)	Reducible	Bowel	Operation	Patient cured
Coley	1921	25	M		Petit's triangle (right and left)	Painful on exercise	No sac	Exploratory incision closure without repair	Condition recurred
Lambret, Dhalluin	1922	54	M		Grynfeltt space	Reducible	Epiploon		
Mulligan	1922	13	F	Previous spondylitic abscess	Left side		Bowel kidney	Operation	
[illegible]	1923	10	M	Previous wound	Below 12th rib (Grynfeltt space) (left)	Reducible		Operation	
[illegible]	1924	18 mo	M	Congenital	Costolumbar abdominal triangle (right)	Reducible	Kidney	Operation	
[illegible]	1925	11	M	Effort in lifting weight	Below 12th rib (left and right)	Reducible	Fat	Operation on right side	

Cases of Lumbar Hernia Reported in Literature (Continued)

Author	Date	Patient		Cause	Hernia			Treatment	Comment
		Age	Sex		Site	Condition	Contents		
Virgillo	1925	21	M	Heavy work	Grynfeltt space (left)	Reducible	Fat	Operation	
Sarnoff	1932	37	F	Injury in fall off streetcar a year after nephrectomy	Left lumbar region	Incompletely reducible	Large omentum, descending colon, many coils of small bowel, part of ovarian cyst	Operation	Patient cured
Edwards	1933				Grynfeltt space		Fat attached to ascending colon	Operation	
Turner	1933	64	M		Petit's triangle (left)	Reducible	Diverticulum of descending colon		
Higham	1935	31	M	Heavy lifting 7 years before	Petit's triangle (right)	Not reducible, superficially edematous	Gangrenous appendix	Operation (no attempt to repair orifice, since high cecum occluded it naturally)	Arrested descent of cecum permitted appendix to enter sac
Kelton	1939	45	F	Kidney operation	Right lateral abdominal region			Operation	
Sibilla	1941	50	F	Operation for calculus	Left lumbar region	Reducible		Operation	Patient cured
Kapsinow	1943	48	M	Effort in dragging electric poles	Over iliac crest (left)		Part of descending colon	Operation	Patient cured

Stubenbord	1944	23	M	Twisting during repair of car	Over iliac crest left loin			*Operation*	*Patient cured*
Flickinger Masson	1946	41	F	Congenital	Petit's triangle (left and right)	Reducible	Bowel right kidney meningocele	Operation on right	Tubo-ovarian abscess on left, cystic oophoritis on right, successful repair on right, left to be treated later
Thorek, Max	1949	69	M	Injury to back	Grynfeltt-Lesshaft space	Not reducible	Components Gerota's capsule and kidney	Operation	*Patient cured*
Thorek, Max	1949	41	M	Injury to back	Left lumbar region	Not reducible	Lower lumbar arteries and nerve fat	Operation	*Patient cured*

SOMMAIRE

La hernie lombaire peut survenir en toute région lombaire, elle peut être *congénitale ou* acquise Si congenitale, elle est dûe a un developpement prénatal défectueux La hernie lombaire acquise peut être ou spontanée ou traumatique Si spontanée, elle est probablement *due au développement* retarde de quelques faiblesses pré natales, si acquise, elle est due a un effort, a un traumatisme

Je classifie les hernies lombaires ainsi 1) *extrapéritoneale.* la hernie des viscères se faisant à travers un espace lombaire quelconque, la hernie n'ayant aucun revêtement péritoneal, 2)—*parapéritoneale:* hernie des viscéres, accompagnées par une portion adhérente du peritoine accompagnant la naissance de la hernie, 3)—*Completement intrapéritonéale* la hernie lombaire glissante avec le peritoine qui accompagne son développement et la couvre entierement formant un sac peritóneal

La hernie lombaire peut être unilatérale ou bilatérale le type unilatéral est le plus fréquent Cette hernie se rencontre plus souvent chez le mâle que chez la femelle et montre une prédilection pour le côté gauche du corps Elle peut apparaître à tout âge, mais cela a lieu le plus fréquemment chez les personnes de l'age moyen

Amoins qu'il n'y ait une *contre indication* très définie, le traitement de choix est l'opération radicale Le pronostic est généralement favorable

ZUSAMMENFASSUNG

Lumbalhernien koennen an jeder Stelle der Lendengegend auftreten, und sind entweder angeboren oder erworben Die angeborenen sind die Folge mangelhafter Entwicklung vor der Geburt Erworbene Lendenbrueche koennen spontan oder als Folge von Verletzungen auftreten Die spontanen muessen wohl als Spaetfolgen einer vor der Geburt entstandenen Schwaeche aufgefasst werden, die traumatischen kommen durch Verletzung oder Zerrung zustande

Ich habe die Lendenbrueche in folgende Gruppen eingeteilt

1 *Extraperitoneale* Herniierung von Eingeweiden durch einen der beiden Lumbalspalte, wobei die entschluepften Teile keinen Bauchfellueberzug haben

2. *Paraperitoneale* Herniierung von Eingeweiden oder Eingeweideteilen, die nach dem Absinken des Bruches noch von einem anhaftenden Stueck Bauchfell begleitet werden.
3. *Voellig intraperitoneale (gleitende)* Lumbalhernie, wobei das Bauchfell die absteigende Hernie begleitet und sie unter Formung eines echten Bauchfellsackes vollstaendig einhuellt.

Lendenhernien koennen einseitig oder doppelseitig auftreten. Die einseitige Form kommt haeufiger unter den erworbenen Hernien vor. Lendenbrueche sind bei Maennern haeufiger als bei Frauen und bevorzugen die linke Koerperhaelfte. Eine Altersgrenze gibt es weder nach oben noch nach unten, am haeufigsten aber werden Personen im mittleren Lebensalter betroffen. Die Behandlung der Wahl ist die Radikaloperation, sofern nicht ausgesprochene Gegenindikationen vorliegen. Die Prognose ist im allgemeinen guenstig.

RIASSUNTO

Le ernie lombari possono essere congenite o acquisite. Le congenite sono dovute ad un difettoso sviluppo prenatale. Le ernie acquisite possono essere invece spontanee a traumatiche. Le spontanee sono probabilmente la conseguenza tardiva di una debolezza muscolare prenatale. Le ernie traumatiche derivano invece da una lesione o da uno sforzo eccessivo.

L'A. classifica le ernie lombari in: (1) extraperitoneali, nelle quali gli organi erniati attraverso un difetto dei muscoli lombari non hanno un rivestimento peritoneale: (2) paraperitoneali, nelle quali gli organi o parte degli organi erniati sono accompagnati dal peritoneo che aderisce loro e che segue l'ernia nella sua discesa: (3) completamente intraperitoneali (per scivolamento), nelle quali il peritoneo accompagna e riveste intieramente l'ernia, formando un vero sacco.

Le ernie possono essere mono- o bilaterali: quelle monolaterali sono piu' frequenti nelle forme acquisite. Colpiscono piu' spesso il sesso maschile e ricorrono piu' frequentemente a sinistra. Non esisterebbe un limite di eta': la maggiore frequenza e' pero' nell'eta' media.

Qualora non esistano particolari controindicazioni, la cura di elezione consiste nell'operazione radicale. La prognosi e' generalmente favorevole.

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Echoes of the Past

III Georges Clemenceau, Physician to the Poor

During World War I all nations learned of Georges Clemenceau Premier of France He was familiarly called The Tiger of France" His was a stormy life, filled with many episodes of 'blood and thunder' Georges Clemenceau (1841 1929) has found a permanent place in French history as a great statesman

Clemenceau entered public life during the Second French Empire At that time the call to democracy was being heard throughout France The 'Tiger" was a radical and became a candidate for Mayor of Montmartre He was elected mayor, served well and soon found himself a member of the Chamber of Deputies

In 1880 he founded the newspaper *La Justice*, the official publication of French radicals He became the leading journalist of Paris and subsequently, of France During the famous Dreyfus trial Clemenceau sided with Dreyfus and dedicated his new paper *L'Aurore* to the defense of the accused Dreyfus was convicted and sentenced to Devil's Island Five years later after constant agitation Clemenceau brought about a new trial Finally it was declared that Dreyfus was the victim of perjury and forgery He was exonerated and restored to his command in the army

By this time Clemenceau was a national figure In 1902 he was elected to the French Senate Four years later he became Premier of France, resigning in 1911

In 1917 during World War I, the position of France was perilous The people called upon Clemenceau to become Prime Minister as well as Minister of War This he did, and at the age of 76 he became not only "the Tiger of France" but 'the Savior of France" But this repetition of the political success of a great statesman is but the superstructure, let us look into the background of Clemenceau, the poor physician to the poor Little has been written of "the Tiger" as a poor physician in Montmartre before he entered politics by seeking the office of mayor

Clemenceau was born in a little town on the Bay of Biscay His father was a physician as was his grandfather Following a prescribed curriculum, he qualified as a medical student and entered the hospital at Nantes He finally matriculated at the University of Paris, from which he received his medical degree After graduation he returned to Montmartre, where he established himself as a country physician

Medical practice was interrupted for three years while Clemenceau visited America During this visit he married Miss Mary Plummer in New York (June 23, 1869), after which he returned to medical practice in Montmartre His parents were people of the working classes He did not have a lucrative practice, but he had many patients He found himself more concerned with their social problems than with their physical ills, he was a poor physician both from a financial and a medical viewpoint

His free medical service to the people of Montmartre made him so popular that when he decided to abandon medicine for politics he had many devoted followers in Montmartre His election as mayor launched him on his outstanding political career

Medical history records nothing of value under the name of Georges Clemenceau but the political history of France is voluminous in tribute to the nation's 'Savior" Here again are recorded the successful accomplishments of an unsuccessful physician

Bernard J Ficarra, M D , F I C S

Principles and Applications of Stereoencephalotomy

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IN TREATING various diseases of the central nervous system it is desirable to carry out therapeutic procedures in the depth of the brain. The classic methods of brain surgery necessitate the exposure of deep-lying areas. Usually this is associated with unavoidable damage to parts of the brain located above the region which the surgeon attempts to reach. However, over forty years ago a method was introduced by Horsley and Clarke[1] for experimental work in animals, permitting the surgeon to place lesions in deep-seated areas of the brain with minimum injury to overlying structures. Curiously enough, as far as we know, this method was not applied to man prior to our first publication[2] in 1947.

The main reason for the long-continued limitation of this method to experimental animals is the great variability in size and shape of the skull in man. This makes it impossible to place a lesion in a certain subcortical area with any degree of accuracy if one uses a landmark of the skull as a point of reference—for instance, the external auditory meatus. This is possible only in animals in which the size and shape of the head are approximately uniform; for instance, cats and monkeys. We have tried to overcome these difficulties as regards the human skull by using a point within the brain, usually the pineal body, as a reference point. Its position in relation to the coordinates of the apparatus is determined by simple roentgen photographs of the skull with the apparatus in situ if the pineal gland is calcified. Otherwise, pneumoencephalographic visualization of the ventricles is necessary.

The apparatus, which we have called the stereoencephalotome, consists of an electrode carrier, a cubiform frame and a base. The carrier can be mounted to the top, the sides or the back of the frame; it allows the electrode to be moved in any plane. The base originally consisted of a ring upon which was mounted a plaster cast of the skull prepared individually for each patient. The present apparatus (Fig. 1) eliminates the plaster cast and anchors the base of the stereoencephalotome to the skull by means of four rubber plugs or by four stainless steel pins which are inserted into small drill holes in the skull. The base of the apparatus is aligned so that its frame is parallel to a plane determined by the inferior border of the orbits and the external auditory canals, the so-called horizontal plane. As has been mentioned, the coordinates of the apparatus are referred to a point within the brain, namely the pineal gland. Roentgenograms are taken with the apparatus in position, and the relation of the pineal gland to the electrode is established.

In order to be able to reapply the base at operation in exactly the same position it occupied during the roentgenographic procedure, the following precautions are taken: An additional superstructure containing five movable pins (one at the intersection of the sagittal and interaural planes, two in the sagittal plane and two in the interaural plane) is mounted to the frame (Fig. 2); the points of the scalp touched by the pins are tatooed before the roentgenograms are taken. Furthermore, the distance between the upper end of the tubes, in which the pins are movable, and the corresponding tattoo marks is measured. Before operation the base has to be reapplied in such a way that the pins exactly touch the tattoo marks and that the aforementioned distances are the same as when the roentgen films were taken. If the pineal gland is not visualized then a pneumoencephalogram is done, and the electrode is oriented with reference to the suprapineal recess or other structures in the neighborhood of the third ventricle. With these data and the aid of brain specimens sectioned in the planes of the stereoencephalotome, one can compute the coordinates necessary to produce the lesions desired, for instance of the dorsomedial nucleus of the thalamus (thala-

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motomy) or of the spinothalamic tract in the midbrain (mesencephalotomy)

Local or nitrous oxide—ether anesthesia is employed The patient is placed in a semireclining position and the base of the apparatus is applied An 8 cm. tranverse scalp incision is made, usually in the interaural plane A trephine opening is made just to the right or left of the midline and the superior longitudinal sinus is exposed The superstructure is applied to the base and the midline identified The dura is punctured at the point where one wishes to introduce the electrode and the latter is lowered according to the measurements obtained from the roentgen film For production of circumscribed lesions we have found electrolysis preferable to electrocoagulation by high frequency current which we had used in a part of our material The needle electrode producing the lesion is connected to the anode of a D C , the cathode is a large indifferent plate electrode placed under the patient's buttocks Where a small spherical lesion is desired the electrode consists of an insulated *wire bared at its tip for a distance of 1 5 mm* Where several large lesions are desired, the electrode consists of an outer insulated tube through which passes a stainless steel stylet The outer tube is closed at its pointed tip and has a side opening above the tip The stylet may be pushed through the side opening for production of the lesion, then withdrawn and the entire electrode rotated In this manner one can make several rosettes of lesions at any desired level all through a single puncture When the final lesion is made a droplet of pantopaque or lipiodol may be instilled through the stainless steel tube and its position verified postoperatively by roentgenographic study (Fig 3) Occasionally when there is residual air in the ventricles one can ascertain the position of the electrode by recording subcortical potentials as the electrode passes through the lateral ventricle

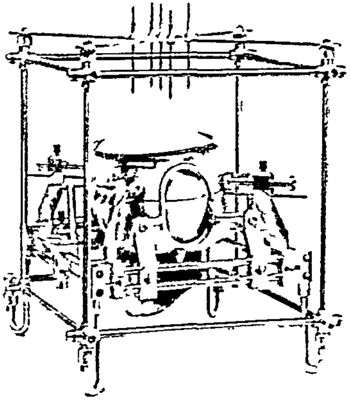

Fig 2 —Stereoencephalotome (posterior view) Needle carrier is replaced by 5 pins for tattoo marks

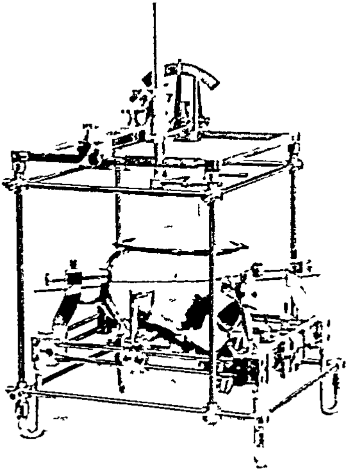

Fig 1 —Stereoencephalotome (side view)

In this paper we should like to report our experiences with three of the numerous possible applications of stereoencephalotomy (1) in psychosurgery, (2) in the treatment of unbearable pain, and (3) in the study and treatment of certain types of convulsive disorders

I. THALAMOTOMY AND HYPOTHALAMOTOMY IN MENTAL DISORDERS

In the treatment of mental disorders thalamotomy represents an attempt to obtain the beneficial effects of prefrontal lobotomy, particularly in the emotional sphere, and to avoid its undesirable by-effects as far as possible. In prefrontal lobotomy one cuts through the white matter of the frontal lobe, interrupting the connections of the frontal association areas with other parts of the cerebral cortex and subcortical ganglia; often one also produces unintended lesions, particularly in the region of the basal ganglia. Topectomy and transorbital leukotomy also destroy association systems of the frontal lobe, as well as its projection systems.

Dorsomedial thalamotomy produces bilateral small circumscribed lesions in the dorsomedial nucleus of the thalamus, the nucleus which degenerates after prefrontal lobotomy (Freeman and Watts[3] and others). One attempts in this way to interfere with the corticothalamic interrelationships underlying the emotions, while the cerebral association systems are spared. In hypothalamotomy small unilateral or bilateral lesions are placed in the subthalamus and the lateral hypothalamic regions, which also seem to play an important part in the mechanism of emotions.

Forty-one patients, most of them institutionalized for schizophrenia, depression or severe compulsion neuroses, have been operated upon. The majority had been under psychiatric treatment for one to seventeen years and had also been subjected to various forms of shock therapy without relief. In 2 patients with obsessive compulsive neuroses, prefrontal lobotomies had been performed at other institutions without alleviation of the disturbances.

The material may be divided into four groups according to size, number and location of the lesions.

Group 1: *Single lesions (3 cases).*—In the first case (compulsive obsessive state and depression) we produced only one coagulation on each side; in the second (catatonic schizophrenia) 4 lesions were produced on the left and 1 on the right; in the third (mental deficiency with agitation) 2 lesions were produced in each dorsomedial nucleus. In view of the smallness of the coagulations, each covering about 1/36 of the volume of the dorsomedial nucleus, one could not expect a definite therapeutic effect from the few lesions placed in this initial group. There was a transitory improvement in Case 1, the patient becoming mildly euphoric and less irritable, exhausted and meticulous. This temporary amelioration, however, could hardly be regarded as a consequence of the lesions. These first 3 cases may serve as controls, showing that the psychologic and somatic effects of the operative procedures without sufficient lesions of the dorsomedial nuclei are not able to produce the permanent changes of emotional tone observed in patients in whom a larger number of electrocoagulations were produced in each dorsomedial nucleus.

Group 2: *Five coagulations in each dorsomedial nucleus through 3 puncture canals (8 cases).*

Group 3: *Large electrolytic lesions consisting of 2 or 3 rosettes in the dorsal, central and ventral parts of the dorsomedial nucleus produced through 1 single puncture canal on each side.* Each rosette consists of 4 ovoid lesions, i.e., an anterior, a medial, a posterior and an anterolateral lesion (remaining 30 cases).

Group 4: *Hypothalamic lesions.*—In a group of 7 patients, 1 schizophrenic patient of Group 2 who had relapsed and 6 schizophrenic patients in Group 3 in whom the lesions of the dorsomedial nuclei were insufficient to improve the psychic state, 1 to 3 lesions were placed unilaterally or bilaterally by means of electrocoagulation in the lateral hypothalamic area through a single puncture canal on each side. In order to minimize shock caused by bilateral hypothalamic lesions, they were produced in two stages, with an interval of several weeks between the first and the second operation.

A total of 59 operations was performed on 41 patients. A postoperative death occurred in 1 case in Group 2 and in 1 case in Group 3, so that the operative mortality was 3.4 per cent.

In successful operative cases, beneficial effects upon pathologic symptoms were obtained chiefly in the emotional sphere. Anxiety, tension and worry disappeared or were at least definitely reduced. The patients became more easily manageable then agitation and then aggressive behavior subsided. Hallucinations were reduced, lost their emotional charge, occasionally even disappeared. The same applies to paranoid ideas. Obsessive thinking also lost its force, and compulsive activity disappeared.

The development of this improvement sometimes became manifest after an interval of several weeks or months. In the intermediary stage, repressed symptoms such as hostility or increased libido may become manifest for a while.

Thirty-five patients in Groups 2 and 3 (extensive lesions of the dorsomedial nuclei) were observed for periods varying from four months to over two years. Of these 35 patients 5 returned home with nearly full working capacity, 12 were discharged with diminished working capacity, 8 were more manageable in the hospital, 10 are unchanged and 8 have relapsed.

Particularly in schizophrenic patients, the duration of the disease is an important factor in the success or failure of the operation. The ratio of improved to unimproved patients was 8:5 for schizophrenic persons whose disease had lasted less than five years. This ratio was 4:9 when the schizophrenia had lasted five years or longer.

Relapse may have various causes, partly psychologic, such as increase of the stress to which the patient is subjected after leaving the protective atmosphere of the hospital and returning to daily life and partly anatomic-physiologic. Our main goal in the first part of our work was to ascertain the minimum lesion that would produce a therapeutic effect. We were therefore satisfied in Group 2 to place 5 small lesions affecting about one seventh of the volume of the dorsomedial nuclei. However after placing larger lesions (3 layers of rosettes in each dorsomedial nucleus) we also observed some relapses. In analyzing their development the following facts must be borne in mind. It is rather improbable that the neural mechanism of a complex function like emotion is limited to a single system, such as the connections between the dorsomedial nucleus of the thalamus and the frontal association areas, and it seems rather probable that other systems may participate in this mechanism. One should consider the possibility that particularly hypothalamic connections with the frontal lobes, perhaps by way of the septum or those with areas on the orbital surface shown by strychnine neuronographic study (Ward and McCulloch [4]) may play a part in this mechanism, besides the connections of the dorsomedial nucleus with the frontal association areas. One has therefore, to bear in mind the possibility that even after large lesions of the dorsomedial nuclei have been produced compensatory mechanisms may take place, and that the development of such compensation may be one of the causes of relapse.

Animal experiments particularly induced us to place lesions in the subthalamus and the hypothalamus in patients who relapsed after initial improvement brought about by dorsomedial thalamotomy or in whom this procedure proved insufficient. In the experiments of Spiegel and Miller,[5] subthalamic lesions in cats produced transient somnolence and catalepsy and the animals were less excitable than before operation. In monkeys, Ranson[6] observed, after bilateral lesions had been placed in the lateral hypothalamic areas, the emotional reactions decreased.

In 7 schizophrenic patients we placed 1 to 3 electrocoagulations through 1 puncture canal in the lateral hypothalamic area and the overlying subthalamus. The first case of this type may be briefly described. The patient was an agitated hallucinating schizophrenic who had improved to such an extent after the first thalamotomy that he could be considered nearly normal. One and a half years after the operation he relapsed, again had hallucinations and had to be readmitted because of his catatonic excitement. Since a second thalamotomy increasing the lesion of the dorsomedial nuclei failed to change his condition, it was decided to place a small lesion on either side of the posterior hypothalamus in a two-stage operation. After this procedure he quieted down, had no further hallucinations and became easily manageable. Although he still showed schizophrenic traits, such as laughing inappropriately, he could be discharged from the hospital, and his parents are now trying to readjust him on a farm.

In a second agitated, hallucinative schizophrenic it was also necessary [illegible]teral hypothalamic lesions to t[illegible] medial nuclei. In 5 other cases the addition of unilateral (right) hypothalamotomy to the bilateral dorsomedial thalamotomy seemed sufficient. In 1 of these 5 cases the bilateral dorsomedial thalamotomy was combined with right hypothalamotomy in a one-stage operation. These combined operations relieved the patients from anxiety, emotional overexcitability and agitation, so that they became quiet and more easily manageable. A second patient could be sent home. For the others the time of observation is too short to arrive at a definite conclusion.

The effects of these hypothalamic punctures upon the vegetative system were surprisingly slight. There was in all cases a transitory rise in temperature lasting from one or two days to more than a week. In some instances there were slight anisocoria, detectable in diffuse light only, and a transitory slight vasodilation in the opposite limbs revealed by a slight increase of cutaneous temperature on the opposite side. In contrast to Ranson's monkeys, which refused food and were nauseated after the production of bilateral hypothalamic lesions, most of our patients showed an excellent appetite a few days after the operation. Only 1 was nauseated. Transient polydipsia and polyuria appeared in 2 cases. Somnolence was marked for a few days to more than a week in all cases, and in 1 patient there was a transitory state of catalepsy.

Since our longest observation period after hypothalamotomy is five months, a discussion of long-lasting undesirable side effects is limited to those cases in which only dorsomedial thalamotomy was performed. In 4 cases there were defects of memory lasting for several months and in 3 a diminution of initiative. One of these patients had been previously subjected to prefrontal lobotomy at another hospital. This patient is also more careless in personal appearance.

The data obtained by applying the Wechsler-Bellevue Intelligence Scale to 16 persons before and after dorsomedial thalamotomy, to 3 before and after mesencephalotomy and to 3 before and after paracommissural thalamotomy within one to three weeks and three months after operation were analyzed by Miss R. Koch.

Analysis showed that the differences in mean achievement before and after operation in subtest scores, verbal I.Q., performance I.Q. and full scale I.Q. are statistically insignificant and should be attributed to chance factors or sampling variations. As regards the results in individual cases, the full scale I.Q. dropped in 3 patients in the first postoperative test but recovered in the second or third; 1 schizophrenic patient showed a decline that was more pronounced in the second than in the first postoperative test, apparently owing to progress of the basic disease. A marked increase of the total I.Q., e.g., in an obsessive compulsive neurotic patient with an I.Q. of 85 to 105 in the second postoperative test, may be due to the fact that such a patient becomes better able to concentrate on the task if he is no longer dominated by fears or obsessive thinking.

One of the main objections raised against psychosurgery is the pronounced personality change, which has been described by the statement that the patient "loses his soul." It would seem that one of the chief advantages of thalamotomy is that relief from emotional disorders may be obtained, and that most of the undesirable personality changes following prefrontal lobotomy, such as distraction, childishness, facetiousness, lack of tact or control, profanity and outbursts of temper, do not appear.

The method seems to have the further advantage that only a minimum scarring of the cortex is produced by introducing a thin electrode. This is in contrast with the extensive scars in the cortex and white matter produced by the various types of operation on the frontal lobe, which lead to epileptiform convulsions in a rather high percentage of the patients. In our material, Jacksonian convulsions appeared only once in 1 case, in which bilateral dorsomedial thalamotomy and hypothalamotomy had been performed. Several months after the last operation, a suppurative infection of the upper lid of the left eye developed. During this illness a right-sided seizure of clonic convulsions appeared. A definite relation of this suppuration to the operation could not be established.

The electroencephalograms taken at intervals varying from fifteen minutes up to nearly two years after operation failed to show signs of an increased convulsive reactivity In many instances there were no significant postoperative changes of the rhythm In some cases after extensive lesions of the dorsomedial nuclei or after combination of such lesions with hypothalamotomy there developed a slowing particularly in the frontal leads which subsided within a few weeks This confirms experiments on cats (Spiegel Bremer [8]) showing that α activity may still appear in the electrocorticogram if the circuits between the frontal association areas and the thalamus are interrupted

II MESENCEPHALOTOMY AND MESENCEPHALOTHALAMOTOMY FOR RELIEF OF PAIN

For the treatment of persistent pain by interruption of the central pain conducting pathways, the region of the superior colliculi is of particular interest A relatively small lesion here can interrupt the spinothalamic system as well as the main part of the pain conducting secondary trigeminal tracts However the usual technic of exposure of the midbrain by elevation of the caudal part of the cerebrum as carried out for instance by Walker[9] for mesencephalic tractotomy sometimes may cause considerable damage to the occipital lobe even in the hands of the most skillful neurosurgeon By means of the stereotaxic technic developed by us this region may be reached easily, without the necessity of elevating the cerebrum

It should be emphasized however that the smallness of the area covered by these pain conducting pathways requires extremely exact application of the stereoencephalotome at the preoperative roentgen study as well as during operation in order that these systems may not be missed Furthermore if the pineal gland is not sufficiently calcified and its center can not be exactly determined air encephalographic study is advisable so that the computation can be made from other points e g the posterior commissure

In the first group (3 cases) lesions of the pain conducting pathways in the midbrain were combined with lesions of the dorsomedial nucleus of the thalamus (mesencephalothalamotomy Since lesions of the long pain

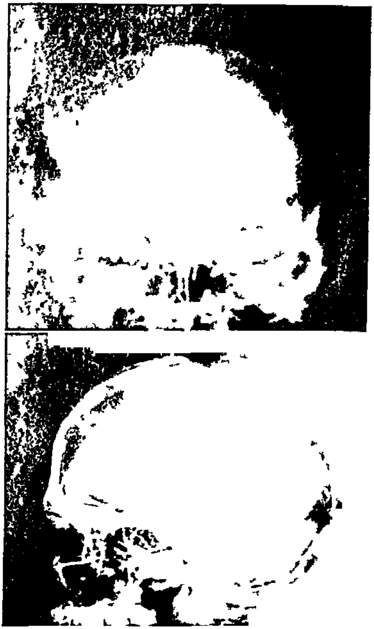

Fig 3—Postoperative roentgenogram showing pantopaque shadow at site of thalamic lesion *Above* anteroposterior view *below* lateral view

conducting systems (such as the spinothalamic tract) may leave accessory pathways intact the thalamic lesions were added to the mesencephalotomy in the hope that the thalamic lesions would produce a state of indifference to residual pain similar to that observed by Freeman and Watts[10] after prefrontal lobotomy

The patients in 2 of these 3 cases suffered from tic douloureux which was unrelieved by retrogasserian rhizotomy performed by other neurosurgeons In the first case the pain disappeared after contralateral mesencephalothalotomy except for occasional paresthesia around the right eye * In the second case the contralateral mesencephalothalomotomy resulted in considerable relief of pain, and the patient did not need narcotics any longer. Interruption of the pathway conducting pain impulses of course produced hemialgesia on the opposite side; it was, however, only transitory in the first case.

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*A detailed description of this case has appeared in Surgery 7 115 1[illegible]

We were particularly interested to learn whether the addition of the thalamic lesion to that in the midbrain produced a state of indifference to pain transmitted by fibers that had escaped the mesencephalic lesion. In this respect the third case yielded valuable information.

The patient suffered from severe diffuse burning pain of the right lower extremity following spinal trauma. Several disc operations, bilateral chordotomies, rhizotomy, lumbar sympathectomy and intraspinal alcohol had failed to relieve her. Bilateral extensive lesions of the dorsomedial nuclei were combined with mesencephalotomy, which apparently only partially injured the spinothalamic systems, since the sensory conditions were essentially unchanged. After this operation the patient presented first a picture of confusion, particularly of disorientation for time and memory defects. During this stage she was rather indifferent to pain and did not complain about it. When asked about the pain she admitted that there was still an area of pain around the buttocks, but she said "I do not feel like yelling." After the state of confusion had subsided she again complained spontaneously about this pain, but the painful area had receded from the entire leg to an area around the right buttock and she no longer required narcotics, while before operation it had been necessary to give her 100 mg. of demerol and 30 mg. of pantopon every three hours. After a period of three months her pain returned to the same degree and extent as before operation. Therefore bilateral mesencephalotomy was repeated. After this operation the area of analgesia that had been produced by the chordotomies was increased from the level of T4 to that of C3, showing that the spinothalamic systems were injured bilaterally. After this procedure the pain was again reduced to an area limited to the right buttock.

In this patient, extensive bilateral lesions of the dorsomedial nuclei resulted in a transitory state of confusion, temporal disorientation and memory defects accompanied by a definite slowing on the electroencephalogram. During this state of confusion her reaction to pain was somewhat similar to that observed by Freeman and Watts after bilateral prefrontal lobotomy. However, when the state of confusion subsided she complained of her pain as much as before operation, and her attention to the pain had apparently returned to the preoperative level.

It seems, therefore, that extensive bilateral lesions of the dorsomedial nucleus produce only a transient state of indifference to pain. We decided, therefore, in the following group of cases to limit the operation to lesions of the pain-conducting pathways in the midbrain (mesencephalotomy).

This second group comprises 2 cases of inoperable carcinoma of the uterus, 1 of inoperable carcinoma of the urinary bladder and 1 of pain in the lower part of the back. This fourth patient had not been relieved by a lumbar laminectomy and a high cervical chordotomy performed by two other surgeons. The latter operation left the patient with a severe burning pain of the entire right lower extremity.

The experiences with bilateral mesencephalotomy in this second group seem to indicate that lesions limited to the pain-conducting pathways in the midbrain without thalamic lesions may be able at least to reduce pain sufficiently to make the condition tolerable. The omission of thalamic lesions has the advantage that one produces a smaller lesion and that the transitory state of disorientation for time and the transient memory defects are avoided.

Compared with spinal anterolateral chordotomy, mesencephalotomy is followed by fewer undesirable side effects. According to Sjöqvist,[11] disturbances of vesical function, sexual function and blood pressure almost invariably accompany transection of the anterolateral tracts in the spinal cord. Besides, this operation not infrequently produces paralyses due to encroachment of the lesion upon the pyramidal tract. In the midbrain the spinothalamic and quintothalamic tracts lie close to the medial aspect of the arm of the inferior colliculus that carries auditory impulses to the cerebral cortex. Lesions of this system may induce impairment of hearing chiefly on the opposite side and transitory tinnitus in the opposite ear. It seems advisable therefore to avoid extension of the lesion too far in the lateral direction, lest the arm of the inferior colliculus be injured. By puncturing the pain-conducting systems from a dorsal direction one may avoid lesions of this part of the auditory system more easily than by mesencephalic tractotomy, since in the latter operation the lateral surface of the midbrain is incised.

Our material has not been observed long enough to enable us to judge the "permanent" results of mesencephalotomy. The patient in Case 1 (facial neuralgia) is still free of pain two years after the operation. However, one must bear in mind that, as after anterolateral chordotomy also following lesions of the spinothalamic and quintothalamic tracts in the midbrain, in some cases the pain may recur and paresthesias may appear in the analgesic or hypoalgesic area.

Mesencephalotomy seems to be indicated particularly in cases of facial pain unrelieved by other conservative and operative procedures, and also in cases of unbearable pain in the arm and chest, since the spinothalamic fibers corresponding to these regions reach the surface, after crossing the midline, in the uppermost cervical segments or in the medulla oblongata, where interruption of this system is more hazardous than in the midbrain.

III. STUDY AND TREATMENT OF CONVULSIVE DISORDERS OF SUBCORTICAL ORIGIN

The stereotaxic method permits one to approach the question whether certain types of convulsive disorders, such as petit mal, characterized by the spike and dome pattern in the electroencephalogram, may have a subcortical origin. In cases of grand mal and petit mal, the electrical discharges from the thalamus were recorded during operation (electrothalamogram) by means of needle electrodes introduced by the stereoencephalotome. In the *electrothalamograms recorded* with the patient under general anesthesia, spike discharges were found which remained limited to the thalamic leads, while the electrocorticogram recorded by scalp electrodes failed to show abnormal discharges[12]). When the electrical discharges were recorded with the patient under local anesthesia, a propagation of the seizure discharges from the thalamus to the cortex could be seen. The seizure discharges first appeared in the thalamus, then these abnormal thalamic discharges were accompanied by similar ones in the frontal leads, and finally the thalamic seizure discharges outlasted those in the frontal lobe. These seizure discharges are not limited to the region of the internal lamina medullaris, on stimulation of which Jasper[13] was able to elicit spike and dome patterns in the electroencephalograms of cats, but they may reach a maximum in distant parts, such as the more dorsal areas of the thalamus.

Our electrographic observations encouraged us to place lesions in dorsomedial areas of the thalamus in patients suffering from grand mal and petit mal, with predominance of the latter type of seizures, in the hope of influencing the latter component. Our experiences with the latter operation (3 cases in which the condition was refractory to the usual medication) are too small to afford definite conclusions as to the results of this procedure. We have not yet succeeded in abolishing the petit mal seizures completely, however, in at least 1 of these 3 cases there was a definite diminution of the number of attacks, the severity of associated motor phenomena (facial twitching, shaking of the head) and the disturbance of consciousness. Our experiences seem to justify the conclusion that in petit mal, at least in a certain group of cases, a subcortical component plays a part, however, relatively large areas of the thalamus seem to be affected, so that lesions of relatively large parts of this ganglion would be necessary to abolish petit mal seizures completely.

SUMMARY

The authors present the results of their experience with stereoencephalotomy in psychosurgical therapy, in the treatment of intolerable pain and in the study and treatment of convulsive disorders. Their technic for carrying out therapeutic procedures in the depth of the brain is described. The opinion is expressed that stereoencephalotomy may permit one not only to obtain new information regarding the physiopathology of subcortical areas

in man but to find new methods for treatment of pathologic conditions related to the brain stem.

RÉSUMÉ

Les auteurs présentent les résultats de leur expérience avec la stéréoencephalotomie dans la thérapie psychochirurgicale, pour le traitement de douleurs intolérables et pour l'étude et le traitement de certains troubles convulsifs. La technique qu'ils emploient pour le traitement thérapeutique dans la profondeur du cerveau est décrite. Ils experiment l'opinion que la stéréoencephalotomie offre de grands avantages dans les recherches et le traitement des conditions pathologiques du cerveau.

ZUSAMMENFASSUNG

Die Verfasser stellen die Ergebnisse ihrer Erfahrung mit der Stereoencephalotomie in der chirurgischen Behandlung von Psychosen. in der Behandlung unertraeglicher Schmerzen und in der Erforschung und Behandlung gewisser Krampfzustaende dar. Sie beschreiben ihre Technik in der Ausfuehrung therapeutischer Eingriffe in der Tiefe des Gehirns. Sie sind der Meinung, dass die Stereoencephalotomie grosse Vorteile bietet in der Erforschung und Behandlung pathologischer Zustaende im Hirnstamm.

RIASSUNTO

Gli AA. riferiscono i loro risultati con la stereoencefalotomia nella terapia psicochirurgica, nell'attenuazione di dolori intollerabili, e nella cura di talune sindromi convulsive. Dopo avere illustrato la tecnica di questo nuovo genere di operazioni cerebrali, gli AA. giungono alla conclusione che la stereoencefalotomia offre dei grandi vantaggi sia dal punto di vista della ricerca scientifica, che della terapia.

RESUMEN

Los autores presentan los resultados de su experiencia con la estereoencéfalotomía en la terapia psicoquirúrgica en el tratamiento del dolor intratable y en el estudio y tratamiento de ciertos trastornos convulsivos. Describen su técnica para llevar a cabo procedimientos terapéuticos en la profundidad del cerebro, expresando el criterio de que la estereoencefalotomí tiene grandes ventajas para la investigación y tratamiento de los procesos patológicos del neuroeje.

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Nothing will sustain you more potently than the power to recognize in your humdrum routine, as perhaps it may be thought, the true poetry of life—the poetry of the commonplace, of the ordinary man, of the plain, toil-worn woman, with their love and their joys, their sorrows and their griefs.—*Sir William Osler*

A New Approach to the Treatment of Subcapital and Transcervical Fractures of the Hip

Preliminary Report

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ANY method that bears promise of success in the treatment of subcapital and transcervical fractures of the hip is worthy of mention I initiated the use of a one-piece flanged hip nail for fractures about the trochanteric region and I have been using this same nail for hip fractures proximal to this area for about a year and half The results to date are of course inconclusive, but they are most promising

The following cardinal points justify use of this nail in treatment of subcapital and transcervical fractures of the neck of the femur

1 It is most important to have absolute immobilization of the nail at its entrance into the thin subtrochanteric cortex A rigid flange attached to the femoral shaft by at least two screws is the minimum means of achieving this stabilization Any motion at this point will result in a "whip" action of the nail in the spongy bone of the femoral neck and head with resulting motion between the proximal and the distal fragment

2 Some absorption with shortening of the neck always results whether union takes place or not

3 As the neck shortens a Smith Peterson nail or lag screw must move along either the proximal or the distal fragment (medially or laterally), unless the fragments remain separated If laterally the head must protrude outside the cortex with motion at this point Any motion here must give rise to motion at the fracture site unless solid union is present

4 As the femoral neck shortens during healing the nail here recommended must traverse the capital fragment in a medial direction and often enters the joint cavity No damage results if the weight bearing surfaces of the head and acetabulum are not invaded

Figure 1 shows the weight-bearing surface which is easily seen in every roentgen film of a hip joint, also are seen the two safety zones just above and below the fovea capitis Of course, as the hip is abducted and adducted the weight bearing surface of the head of the femur will change, but that of the acetabulum remains constant These safety zones should be carefully noted with the patient's leg slightly abducted in the normal walking alignment angle

5 If the nail is close to the anterior surface of the neck, the ligamentum teres probably

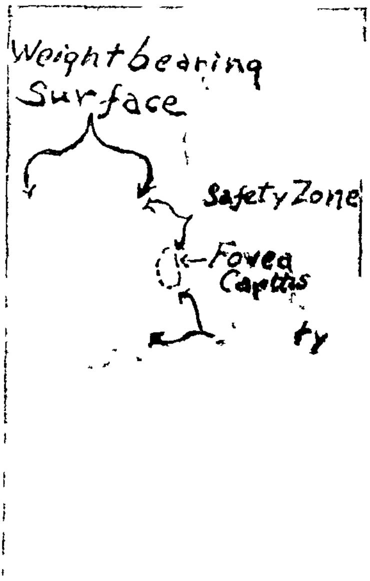

Fig 1 —Weight bearing surface the two "safety zones" above

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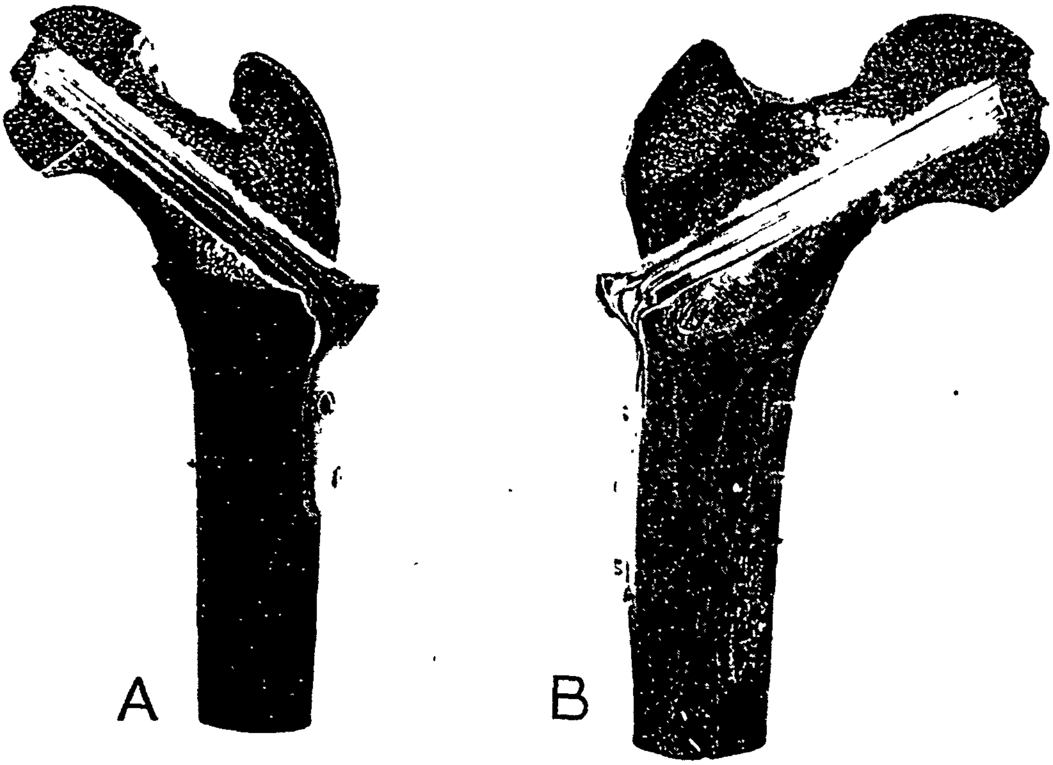

Fig. 2.—*A*, nail in place for subcapital fracture, going just above the fovea and still below the weight-bearing surface of the head. *B*, nail in place for transcervical fracture similar in position to that shown in Figure 2*A*.

will not be injured even if the nail pierces the head on the rim of the fovea. It is better to have the nail just above or below the fovea if possible.

Figure 2 shows the nail correctly placed for a transcervical and a subcapital fracture respectively, with the end of the nail aimed just above the fovea.

Figure 3 is an end view of the head of the femur, with the nail in the middle of the neck, centered just below the fovea.

Of 8 femoral heads studied, this slightly posterior position of the fovea was present in each to a greater or less degree.

6. A 130-degree nail, generally, can be directed just above the fovea and a 120-degree nail just below it. It is always better to have a little more valgus than normal and never to create varus when attaching the flange to the femoral shaft by screws. The more nearly the nail makes a right angle with the fracture site, the less chance there is of a "shearing" action and the better the prospect of union.

7. If the nail penetrates the head and even encroaches into the acetabulum in a non-weight-bearing area, no harm will result if hip motion is kept to a minimum without pain, muscle spasm, grating or weight bearing during the healing period. When solid union is present, the nail must be removed and weight bearing, with increasing range of motion, should be permitted.

The following manipulative, operative and postoperative points should be kept in mind:

(*a*) Accurate reduction of the fracture should be accomplished by the Ledbetter technic, with good anteroposterior and lateral roentgenograms.

(*b*) The so-called "beak" of the lower part of the femoral neck is often broken during reduction by the Ledbetter maneuver. The need for open correction and osteotomy of the "beak" is questioned

(*c*) If the head fragment is held rigid by three guide wires or pins while the nail is driven in over one of these rotation and slipping of the proximal fragment will be prevented, especially if the head fragment is small

(*d*) The driving in of the nail impacts the fragments sufficiently

(*e*) Early ambulation with crutches or walker may be allowed but no full weight bearing is permissible until solid union is demonstrable by roentgenogram (four to six months usually)

Figure 4 and the remaining illustrations furnish roentgen evidence of satisfactory healing The 12 cases are consecutive Since this series was completed I have operated on 2 more fractures of the transcervical vertical type but at the time of writing they are only a week or so old However, reduction and maintenance of reduction in each case are excellent

COMMENT

Of course, it is too early to form any definite opinion about this method of treating subcapital and transcervical fractures of the neck of the femur, whether of the valgus or the much more troublesome varus or vertical type, but the roentgenograms here presented speak for themselves The excellent work done by F Pauwels, Van Gorder, James Dickson Bosworth, Cleveland Neer, McLaughlin and many others has brought out the hazardous prognosis in certain types of the aforedescribed fractures The patients whose roentgenograms are shown in this paper represent a consecutive series and as yet I have encountered no instance of nonunion

A few patients have had the nails removed with no ill effects up to the time of writing Others, I am sure, will have the nail removed later In the meantime they are ambulatory with crutches or a walker but are not bearing any real weight and are not moving the involved hip when they have pain, muscle spasm, limitation of motion or grating

SUMMARY

In the last one and one half years 14 consecutive hips with transcervical and subcapital fractures have been treated by using my nail with two or more screws attaching the flange to the femoral shaft The 14 patients represent about 25 per cent of the 54 patients with fractures of the femoral neck or the trochanteric area on whom I have operated during this period The reasons for using this method and the facts that explain its good points are enumerated and the roentgenograms of this series of patients are presented It is too early to form any definite opinion about the method for such fractures, but so far the results are highly encouraging

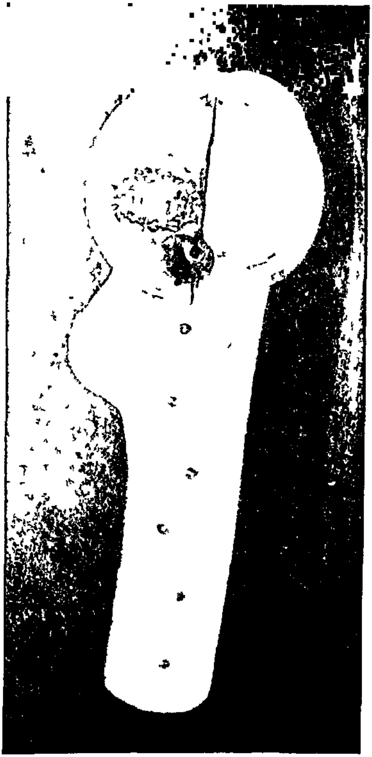

Fig 3 —End view of head of femur with nail in middle of neck, centered just below fovea

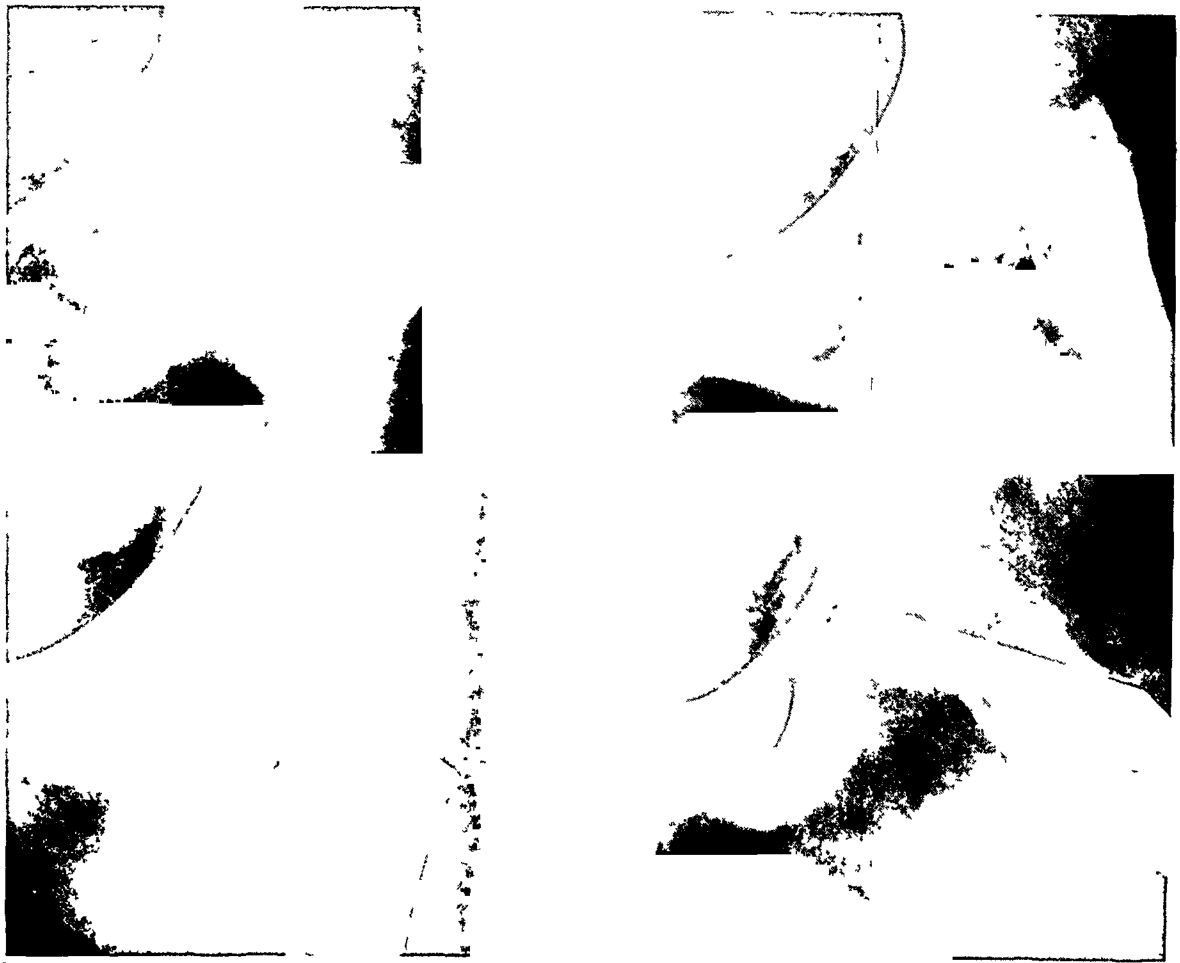

Fig 4—Patient K G. Pre reduction (*upper left*) and nine months postoperative roentgenograms, AP and lateral.

CLOU À UN REBORD POUR LES FRACTURES DE LA TETE ET DU COL DU FEMUR: RAPPORT PRÉLIMINAIRE

Toute méthode permettant quelques chances de succès dans le traitement des fractures de la tête fémorale et dans celles du col du fémur mérite d'être étudiée. J'ai initié l'emploi du clou à un rebord pour les fractures intéressant la région trochantérique J'emploie depuis 18 mois ce même clou pour les fractures de cette région de la hanche Les résultats jusqu'à présent, naturellement, ne sont pas conclusifs, néanmoins ils sont très encourageants.

Les considérations suivantes justifient l'emploi de ce clou dans le traitement des fractures de la tête du femur et dans celles du col de cet os.

1. Il importe d'obtenir l'immobilisation absolue du clou à son entrée dans la couche corticale soustrochantérique. Un rebord rigide attaché au col du femur par deux vis, est le moyen minimum pour obtenir cette stabilisation. Toute motion à ce point produira un mouvement du clou dans la partie spongieuse du col et de la tête du femur Il en resultera un mouvement entre les fragments proches et les fragments eloignés.

2. Quelque absorption et quelque raccourcissement du col, résulte toujours qu'il y ait union ou non.

3. Avec le raccourcissement du col fémoral, le clou Smith-Petersen ira entre ou dans le fragment proximal ou dans le fragment distal (médiallement ou latéralement), à moins que

le fragment reste separe Si ce mouvement est latéral, la tête sortira du cortex et il y aura motion a ce point Tout mouvement a ce point produira un mouvement au siege de la fracture à moins qu'une union solide soit presente

4 Durant la guérison le col femoral se raccourcit Le clou de Jewett traverse le fragment de la tête dans une direction mediale et souvent pénetre dans la cavite articulaire Il n en résulte aucun mauvais résultat si les surfaces de la tête et de l'acetabule qui portent le poids ne sont pas envahies Le dessein numero 1 nous indique la surface qui porte la poids du corps Cette surface est distincte dans tous les films radioagraphiques de l articulation de la hanche, on peut voir aussi les deux zones de sureté immédiatement au dessus et immediatement au dessous de la "fauvette capitis Naturellement, s'il y a abduction ou adduction de la hanche, la surface de la tete du femur qui supporte le poids de la hanche change celle de l'acétabule est constante Ces zones de sûreté doivent être soigneusement observées avec le membre du malade legerement éloigné lateralement de l angle normal present dans la marche

5 Si le clou est proche de la surface interieure du col le ligament droit probablement ne sera pas lesé même si le clou perce le bord de la tete proche de la 'fauvette capitis" Il est mieux que le clou soit légerement au dessus ou au dessous de la fauvette

Le dessin numero 2 nous le clou placé correctement pour une fracture transcervicale ou subcapitale respectivement avec le clou dirige juste au dessus de la fauvette

Le dessin numero 3 est une vue de l'extremite de la tête du femur ayant le clou situe au dessous de la fauvette du col

Des huit cas etudies cette position legerement en arriere de la fauvette etait presente dans un degre plus ou moins grand

6 Un clou de 130 degres peut generalement etre dirige au dessus de la fauvette et un de 120 degres juste plus bas que la fauvette Il est preferable d avoir toujours un valgus au dessus de la normale et de ne pas *creer un varusquand on attache le rebord a* l aide de vis au corps du femur Le plus le clou forme un angle droit avec le siege de la fracture le moins probable qu il y ait d'usure par frottement et le meilleur est le pronostic

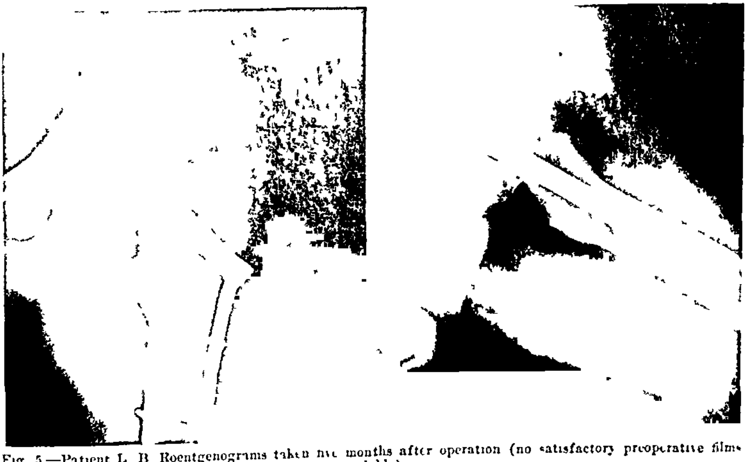

Fig 5—Patient L B Roentgenograms taken five months after operation (no satisfactory preoperative films available)

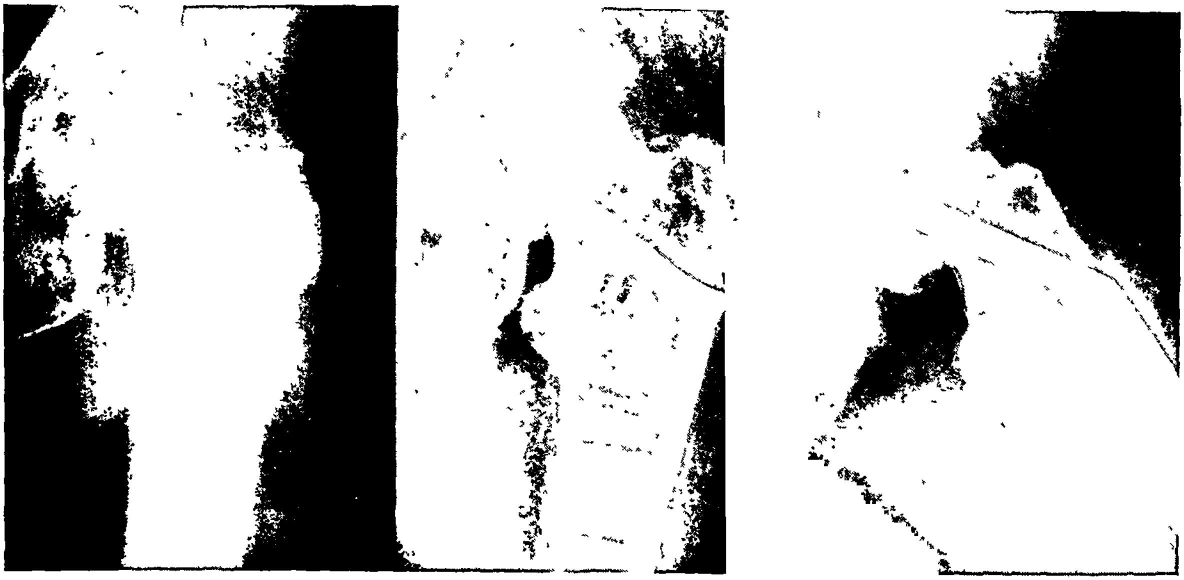

Fig. 6.—Patient C. L. V. V. AP view taken on day of injury (*extreme left*) and AP and lateral views taken four months after operation There is some cystic degeneration of the femoral head. No weight bearing as yet. Union is progressing.

pour l'union.

7. Si le clou pénètre la tête ou pénètre dans l'acétabule dans une région qui ne porte pas le poids du corps, aucune infirmité ne résultera si le mouvement de la hanche est maintenu dans le minimum sans douleurs, sans spasmes musculaires, sans frottement et ne supporte aucun poids durant la période de guérison. Quand l'union solide a été obtenue, le clou peut être enlevé et le poids du corps peut etre autorisé ainsè qu'un une augmentation graduelle de motion.

Les considérations manipulatives, opératoires et postopératoires suïvantes seront observées:

a. La reduction exacte de la fracture par la technique de Ledbetter à l'aide de bons roentgenogrammes anterio-posterieures et latéraux.

b. La projection de la partie inférieuré du col du fémur par la manoeuvre de Ledbetter. Le besoin d'une correction ouverte et d'ostéotomie de cette projection n'est pas approuvée par beaucoup.

c. Si le fragment de la tête est maintenu rigide par trois fils de fer ou épingles pendant que le clou est inséré au-dessus d'une de ces epingles, la rotation et le croissement du fragment proximal sont empechés surtout si le fragment détaché est petit.

d. L'insertion du clou entasse les fragments suffisamment. L'ambulation précoce avec bequilles ou canne peut être permise mais aucun poids n'est permissible, à moins que l'existence d'une solide union soit demontrée par le roentgenogramme.

e. Dans le dessin numero 4, il y a évidence, à l'aide de rayons X, de guérison satisfaisante. Les 12 cas sont consécutifs. Depuis que cette serie est achevée, j'ai opéré 2 fractures transcervicales du type vertical, mais il n'y a qu'une semaine ou deux écoulées au moment de cette revue. La réduction et le maintien de la réduction de chacun de ces cas sont excellents.

COMMENTAIRE

Naturellement, il est trop tôt pour former une opinion définie sur cette méthode de traitement des fractures sous-capitales et transcervicales du col du femur, qu'elles soient du type valgus, ou du type varus qui est beaucoup plus compliqué ou du type vertical, máis les roentgenogrammes párlent pour eux-mêmes.

L'excellent travail fait par F. Pawells, Van Gorder, James Dickson, Bosworth, Cleveland, Neer, McLaughlin et beaucoup d'autres, nous

ont demontré le pronostic hasardeux de certains types des fractures ci-dessus mentionnées

Les malades dont les roentgénogrammes accompagnent cet article representent une serie consecutive, et jusqu'a present je n'ai rencontré aucun cas de non union chez plusieurs malades, ou a enlevé le clous sans effets nocifs, jusqu'a present

Dans les autres cas j'en suis sur on enlevera le clou plus tard Pour le moment les malades sont ambulatoires avec bequilles ou cannes mais ne soumettent la jointure a aucun poids On ne soumettra la hanche attaquee a aucun mouvement en presence de spasmes musculaires, de douleurs, de limitation de motion ou de grattement

GEFLANSCHTER NAGEL ALS EINEM STUECK ZUR BEHANDLUNG SUBKAPITALER UND TRANSZERVIKALER OBERSCHENKELBRUECHE

Vorlaeufiger Bericht

Jede erfolgversprechende Methode der Behandlung subkapitaler und transzervikaler Oberschenkelbrueche verdient berichtet zu werden Ich habe die Anwendung eines geflanschten Hueftnagels aus einem Stueck zur Behandlung von Bruechen in der Trochantergegend eingefuehrt und habe seit etwa 1½ Jahren denselben Nagel in Hueftbruechen die proximal von dieser Gegend gelegen waren benuetzt Die bisherigen Resultate erlauben natuerlich noch keine Schluesse sind aber doch sehr ermutigend Die folgenden wesentlichen Punkte rechtfertigen die Anwendung dieses Nagels in der Behandlung subkapitaler und transzervikaler Brueche des Schenkelhalses

1 Es ist wichtig eine absolute Unbeweglichkeit des Nagels an der Eintrittsstelle in die duenne Knochenrinde der subtrochantaeren Gegend zu erzielen Ein starrer Flansch der *mit mindestens zwei Schrauben am Oberschenkelschaft* befestigt wird ist das einfachste Mittel, eine solche Stabilisierung zu erzielen Jede Bewegung an diesem Punkte muss zu einer "Peitschen" Aktion des Nagels in dem schwammigen Knochen des Oberschenkelhalses und kopfes und schliesslich zur Verschieblichkeit der proximalen und distalen Bruchstuecke gegeneinander fuehren

2 Ein gewisser Grad von Absorption mit Kuerzung des Halses erfolgt immer, gleichgueltig ob eine Verschmelzung der Bruchstuecke eintritt oder nicht

3 Im Verlauf der Kuerzung des Halses muss ein Smith-Peterson Nagel oder eine Schraube sich entweder mit dem proximalen oder dem distalen Bruchstueck (medial oder lateral) mitbewegen es sei denn dass die Fragmente voneinander getrennt bleiben Erfolgt die Bewegung lateral, so muss der Kopf ueber die Knochenrinde hinausragen und an dieser Stelle Beweglichkeit zeigen Jede Bewegung an diesem Punkt muss zur Bewegung an der Bruchstelle fuehren, es sei denn, dass eine starre Verschmelzung stattgefunden hat.

4 Der Jewettnagel muss wenn der Schenkelhals sich waehrend der Heilung verkuerzt das Kopffragment in medialer Richtung durchdringen und haeufig bricht er in die Gelenkhoehle ein Solange die Tragflaechen des Kopfes und des Azetabulums nicht in Mitleidenschaft gezogen sind, entsteht dadurch kein Schaden

Abbildung 1 zeigt die Tragflaeche, wie sie mit Leichtigkeit auf jedem Roentgenbild des Hueftgelenks erkannt werden kann, ausserdem sieht man die beiden Sicherheitszonen oberhalb und unterhalb der Fovea capitis Die Tragflaeche des Oberschenkelkopfes veraendert sich natuerlich mit der Abduktion und Adduktion, waehrend die des Azetabulums unveraendert bleibt Diese Sicherheitszonen muessen waehrend das Bein des Kranken im normalen Gehwinkel leicht abduziert ist, sorgfaeltig beachtet werden

5 Ist der Nagel nahe der Vorderwand des Halses gelegen so hat das Lig teres wahrscheinlich keine Verletzung erlitten, auch wenn der Nagel den Kopf am Rande der Fovea durchbohrt Besser ist es den Nagel, wenn irgend moeglich, knapp oberhalb oder unterhalb der Fovea liegen zu haben

Abbildung 2 zeigt die richtige Lage des Nagels im Falle einer transzervikalen und einer subkapitalen Fraktur, die Spitze des Nagels zielt auf einen Punkt gerade oberhalb der Fovea

Abbildung 3 zeigt das Ende des Oberschenkelkopfes mit dem Nagel in der Mitte des Schenkelhalses, ausgerichtet auf die Gegend knapp unterhalb der Fovea

In acht beobachteten Oberschenkelkoepfen war diese leicht nach hinten gerichtete Lage der Fovea jedesmal in groesserem oder geringerem Masse vorhanden.

6. Ein Nagel mit einer Winkelung von 130 Grad kann im Allgemeinen auf die Gegend gerade oberhalb der Fovea gerichtet werden und einer mit einer 120 graedigen Winkelung auf die Gegend genau unterhalb der Fovea. Bei der Befestigung des Flansches am Oberschenkelschaft mittels Schrauben ist es immer gut, eine leicht uebernormale Valgusstellung zu erzielen und eine Varusstellung unter allen Umstaenden zu vermeiden. Je mehr sich der Winkel zwischen dem Nagel und der Bruchlinie einem rechten Winkel naehert, je geringer ist die Gefahr, dass es zu einer "Scheren"—Aktion kommt, und um so besser sind die Aussichten fuer eine Heilung.

7. Dass der Nagel den Kopf durchbohrt und sogar das Azetabulum in einer Gegend, die keine Tragflaeche ist, angreift, schadet nichts, wenn waehrend der Heilungsperiode die Huefte so unbeweglich wie moeglich gehalten wird, und wenn Schmerzen, Muskelkraempfe, Reibung und Belastung vermieden werden. Wenn es zu einer knoechernen Vereinigung gekommen ist, muss der Nagel entfernt werden, und Belastung mit wachsender Bewegungsfreiheit kann gestattet werden.

Folgende die Behandlung, die Operation

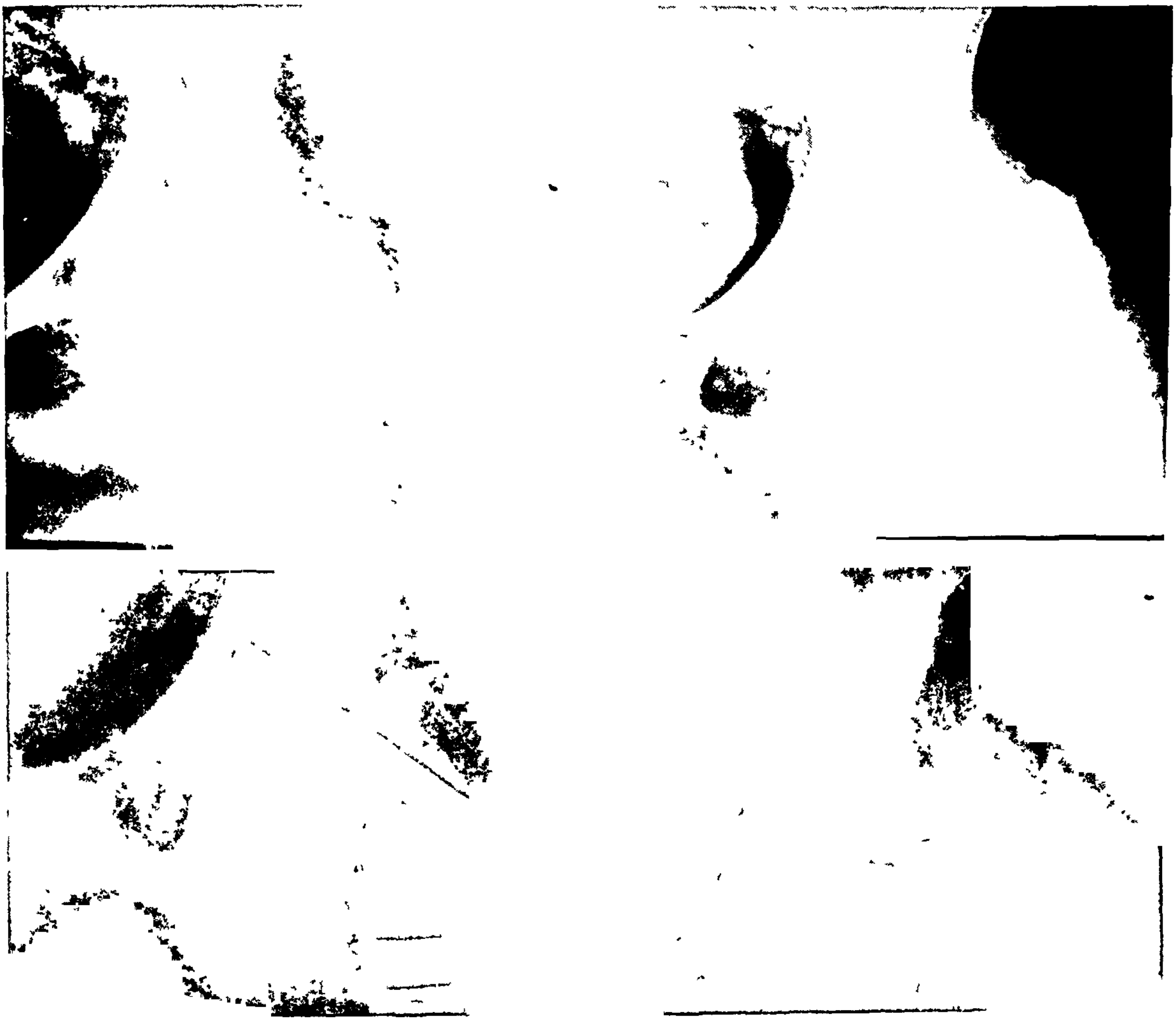

Fig. 7.—Patient E. H. Films taken on day of injury (*upper left*) and four months after operation. Nail to be removed later. Meantime hip is kept painless. No weight bearing.

und die Nachbehandlung betreffenden Punkte sollten beachtet werden

(a) Sorgfaeltige Einrichtung des Bruches nach der Ledbetterschen Technik mit guten ventrodorsalen und seitlichen Roentgenbildern

(b) Der sogenannte Schnabel der unteren Haelfte des Schenkelhalses wird waehrend des Ledbetterschen Einrichtungsmanoevers haeufig gebrochen Die Notwendigkeit einer offenen Einrichtung und einer Osteotomie des "Schnabels" wird in Frage gestellt

(c) Drehung und Verrutschung des proximalen Bruchstuecks kann besonders wenn das Kopffragment klein ist verhindert werden indem das Kopffragment durch drei Fuehrungsdraehte oder nadeln festgehalten wird waehrend der Nagel ueber eine von diesen hineingetrieben wird

(d) Das Hineintreiben des Nagels ergibt eine hinreichende Zusammenpressung der Bruchstuecke

(e) Fruehzeitige Bewegung an Kruecken oder im Gehapparat kann gestattet werden dagegen ist eine volle Belastung unzulaessig bevor eine knoecherne Vereinigung roentgenologisch nachgewiesen werden kann (im allgemeinen vier bis sechs Monate)

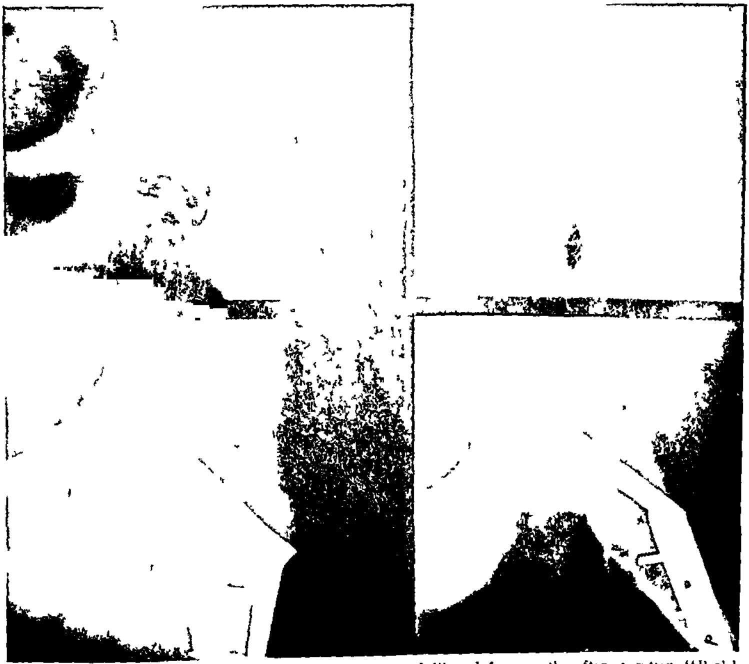

Fig 8 —Patient I C Films taken on day of injury (*upper left*) and four months after operation "Beak" not broken and not interfering with union

Abbildung 4 und die folgenden zeigen den Roentgennachweis zufriedenstellender Heilung. Die zwoelf Kranken stellen eine ununterbrochene Reihe aufeinanderfolgender Faelle dar. Seit der Beendigung der Serie habe ich zwei weitere Frakturen von transzervikalem vertikalem Typus operiert. Diese sind aber, waehrend diese Zeilen geschrieben werden, erst ungefaehr eine Woche alt. Die Einrichtung und die Erhaltung der Stellung ist in beiden Faellen ausgezeichnet.

ANMERKUNG

Es waere natuerlich verfrueht, sich ueber diese Behandlungsmethode subkapitaler und transzervikaler Schenkelhalsbrueche, seien sie nun vom Valgustypus oder vom (viel schwierigeren) Varus-oder vertikalen Typus, ein endgueltiges Urteil zu bilden. Die Roentgenbilder aber, die hier gezeigt werden, sprechen fuer sich selbst. Die ausgezeichneten Arbeiten von F. Pauwels, Van Gorder, James Dickson, Bosworth, Cleveland, Neer, McLaughlin und vielen anderen haben das prognostische Risiko bei gewissen Typen der oben beschriebenen Brueche hervorgehoben. Die Kranken, deren Roentgenbilder in meiner Arbeit gezeigt werden, stellen eine ununterbrochene Serie dar, und bisher habe ich keinen Fall von Nichtheilung gehabt.

Bei einigen Kranken sind die Naegel entfernt worden, ohne dass nachteilige Folgen bis zu dem Augenblick, wo diese Zeilen geschrieben werden, beobachtet wurden. Ich zweifle nicht, dass weitere Kranke von ihren Naegeln spaeter befreit werden koennen. Inzwischen bewegen sie sich auf Kruecken oder im Gehapparat, ohne das Bein wirklich zu belasten und ohne die befallene Huefte zu bewegen, wenn sie Schmerzen, Muskelkraempfe, Bewegungsbehinderung oder Knirschen aufweisen.

CLAVO DE UNA PIEZA CON REBORDE PARA LAS FRACTURAS SUBCAPITAL Y TRANSCERVICAL DE LA CADERA (Informe preliminar)

Cualquier método que prometa ser un éxito en el tratamiento de las fracturas subcapital

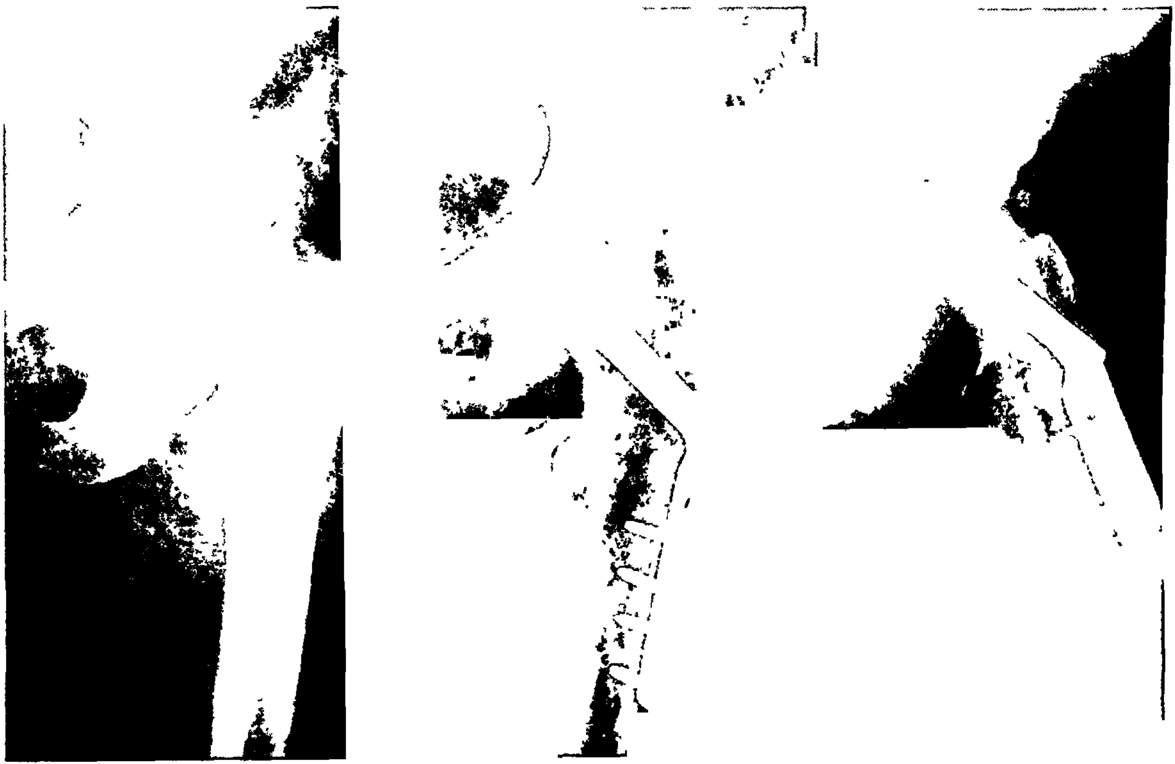

Fig. 9.—Patient I. N. Films taken on day of injury (*extreme left*) and three months after operation. "Beak" broken off during manipulation. Nail removed nine months after operation. Excellent results.

y transcervical de la cadera es digno de mencionarse He iniciado el uso de un clavo de una pieza con reborde, para la fractura cerca de la región trocantérica y he estado usando este clavo para las fracturas de la cadera proximas a este área durante un año y medio Los resultados hasta la fecha, por supuesto no son concluyentes, pero si muy prometedores

Los siguientes puntos cardinales justifican el uso de este clavo en el tratamiento de las fracturas subcapital y transcervical del cuello del fémur

1 Es importante la absoluta inmobilizacion del clavo al entrar dentro del cortex subtrocantérico delgado Un reborde rigido sujeto al eje femoral por lo menos con dos tornillos, es el modo más sencillo para conseguir esta estabilidad Cualquier movimiento en este punto resultará en una accion violenta del clavo en el cuello y cabeza femoral con el resultante movimiento entre el fragmento distal y proximal

2 Ya se consiga unión o no siempre resulta alguna absorción, con acortamiento del cuello

3 Al acortarse el cuello, debe moverse un clavo de Smitt Peterson, o tornillo, a lo largo del fragmento distal o proximal (del centro o lateralmente) a no ser que los fragmentos permanezcan separados Si se mueve lateralmente, la cabeza debe sobresalir por fuera del córtex con movimiento en este punto Cualquier movimiento en este punto debe causar movimiento en el lugar de la fractura, a menos que exista una unión sólida

4 Al acortarse el cuello femoral durante la curación, el clavo de Jewett debe atravesar el fragmento capital en una direccion media y con frecuencia entra en la cavidad de la articulación No resulta lesion si no se invaden las superficies que sostienen el peso de la cabeza y del acetabulo

La figura 1 muestra la superficie que sostiene el peso, que puede verse facilmente en los rayos X de una articulación de la cadera, también pueden verse las dos areas de seguridad por encima y por debajo del fóvea capitis Por supuesto, la abducción y aducción de las superficies que sostienen el peso hace cambiar la cabeza del fémur, pero la del acetabulo permanece fija Estas zonas de seguridad deben notarse cuidadosamente con la pierna del paciente ligeramente en abducción en ángulo de alineación del andar normal

5 Si el clavo esta cerca de la superficie anterior del cuello, el ligamento del teres probablemente no sera lesionado, aún si el clavo atraviesa la cabeza sobre el borde del fovea Es mejor tener el clavo si es posible por encima o por debajo del fovea La figura 2 muestra el clavo correctamente colocado para una fractura transcervical y subcapital respectivamente con el extremo del clavo dirigido justamente por encima del fóvea La figura 3 es una vision final de la cabeza del femur con el clavo, en el medio del cuello encentrado justamente por debajo del fóvea De ocho cabezas femorales estudiadas, esta posicion ligeramente posterior del fóvea existia en cada una en mayor o menor grado

6 Un clavo de 130 grados por lo general puede dirigirse justamente por encima del fovea y un clavo de 120 grados justamente por debajo Siempre es mejor tener un poco mas valgus que el normal y nunca crear varus cuando se adjunte el reborde al eje femoral por medio de tornillos Mientras mas cercanamente el clavo este en ángulo recto con el lugar de la fractura menos chance hay de separacion y mejor prospecto para la unión

7 Si el clavo penetra la cabeza y aun se mete dentro del acetabulo en un area que no sostenga peso, no resultara perjuicio alguno si el movimiento de la cadera se conserva al minimo, sin dolor, espasmo muscular irritacion o sostenimiento de peso durante el periodo de curacion Cuando exista una union solida debe removerse el clavo debiendo permitirse el aguantar peso y el aumento del movimiento Deben considerarse los siguientes puntos de manipulación, operación y postoperatorios

(a) Reducción exacta de la fractura por la tecnica de Ledbetter, con buenas radiografías anterior posterior y lateral

(b) El llamado "promotorio" de la parte mas baja del cuello femoral con frecuencia se fractura durante la reducción por la manobra de Ledbetter Se pregunta si hay necesidad de una correccion abierta y de osteotomia del 'promotorio"

(c) Si el fragmento de la cabeza se mantiene rigido por tres alambres de guia o alfileres mientras que el clavo se dirije sobre

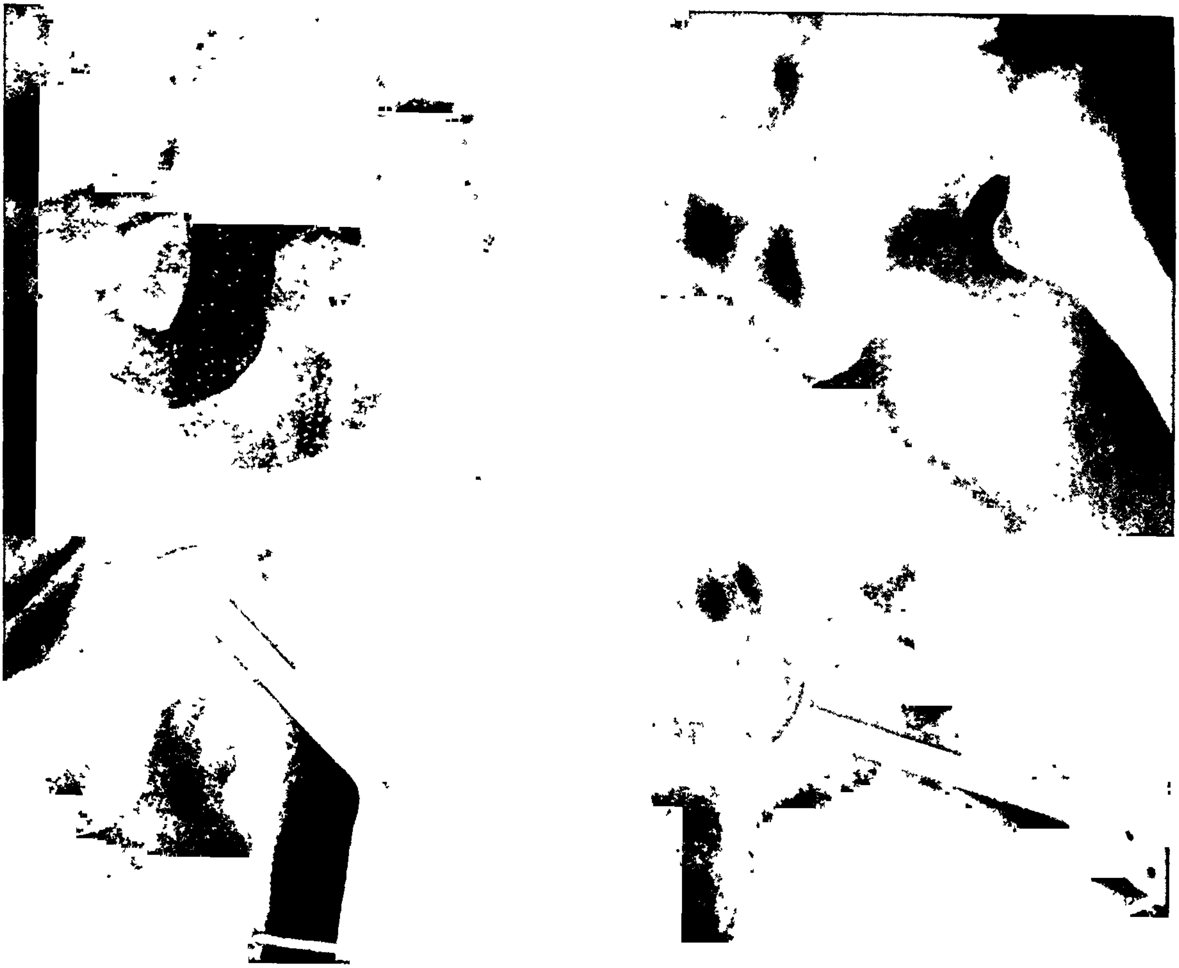

Fig. 10.—Patient F. H. Films taken on day of injury (*upper left*) and three months after operation. "Beak" partially broken off at time of fracture. Union solid. Nail to be removed if it produces any articular symptoms. At present there are none.

uno de éstos se prevendrá la rotación y separación del fragmento proximal, especialmente si el fragmento de la cabeza es pequeño.

(*d*) La introducción del clavo alcanza al fragmento suficientemente.

(*e*) Puede permitirse la ambulación precoz con muletas o andador, pero no está permitido el recargar todo el peso, hasta comprobar por las radiografías que existe una unión sólida (4 a 6 meses, por lo general).

La figura 4 y las ilustraciones restantes ofrecen pruebas radiográficas de la curación satisfactoria. Los 12 casos son consecutivos. Desde que se completó esta serie he operado otras dos fracturas del tipo transcervical vertical, pero al escribir esta comunicación solamente había transcurrido una semana. Sin embargo, la reducción y el mantenimiento de la reducción, en cada caso, es excelente.

COMENTARIO

Es todavía prematuro formar una opinión definitiva sobre este método para el tratamiento de las fracturas subcapital y transcervical del cuello del fémur, ya sean del tipo valgus o del mucho más difícil varus vertical, pero las radiografías presentadas aquí hablan por sí solas. El trabajo excelente realizado por F. Pauwels, Van Gorder, James Dickson, Bosworth, Cleveland, Neer, McLaughlin y muchos otros, ha revelado el prognóstico peligroso en ciertos tipos de las fracturas arriba mencionadas. Los pacientes cuyas radiografías se muestran en esta comunicación representan una

serie consecutiva y todavia no he encontrado un caso en que no hubiera habido union Se han removido los clavos a unos cuantos pacientes, sin observarse efectos secundarios hasta el momento de preparar esta comunicacion A otros pacientes, estoy seguro se les removera el clavo mas tarde Mientras tanto *son pacientes ambulatorios* con *muletas o un* andador, pero no hacen peso ni mueven la cadera afectada cuando experimentan dolor espasmo muscular, limitacion del movimiento o irritacion

CHIODI A TESTATA PER FRATTURE TRANSCERVICALI E SOTTOCAPITALI DELL ANCA

Nota Preliminare

Qualsiasi metodo capace di migliorare i risultati delle fratture sottocapitali e transcervicali dell anca e' degno di pubblicazione Ecco perche' l'A descrive in un articolo preliminare una nuova tecnica per le fratture *nella regione trocanterica* tecnica che egli ha adottato da 1 anno ½ e che sembra promettere dei buoni risultati

Le seguenti considerazioni giustificano la dozione di un speciale chiodo a testata nelle fratture del collo femorale

1 E' necessario mantenere una completa immobilizzazione del chiodo al livello del punto d'entrata nella sottile corteccia subtrocanterica Una testata rigida attaccata mediante alcune viti all'asse femorale e il mezzo piu semplice per ottenere un immobilizzazione Qualsiasi spostamento a questo livello si trasforma in un movimento di frusta del chiodo nel tessuto spugnoso del collo e della testa femorale con una conseguente mobilizzazione del frammento prossimale verso il frammento distale

2 Un assorbimento osseo con accorciamento del collo femorale avviene sempre indipendentemente da un unione o meno dei capi ossei

3 Durante la fase di accorciamento un chiodo di Smith Peterson oppure una vite a testa quadrata deve accompagnare i movi*menti del frammento prossimale o distale* (medialmente o lateralmente) a meno che i frammenti rimangano separati Se lateralmente la testa deve protrudere al di fuori delle corteccia di modo che i movimenti che si compiono a questo livello si trasmettono alla sede della frattura qualora non si sia gia verificata una solida unione

4 Mentre il processo di guarigione conduce ad un accorciamento del collo femorale il chiodo di Jewett deve attraversare il frammento capitale in una direzione mediale entrando spesso nello cavita articolare Se la superficie di sostegno della testa femorale e l acetabolo vengono rispettati cio non comporta alcun inconveniente

La figura 1 dimostra la superficie di sostegno facilmente visibile in ogni radiografia

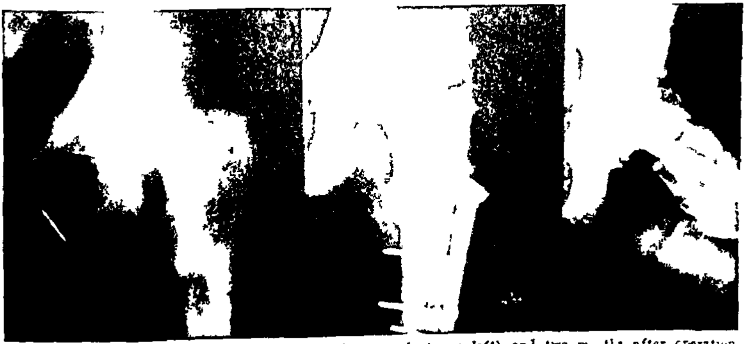

Fig 11—Patient W L N Films taken on day of injury (*extreme left*) and two months after operation Union progressing

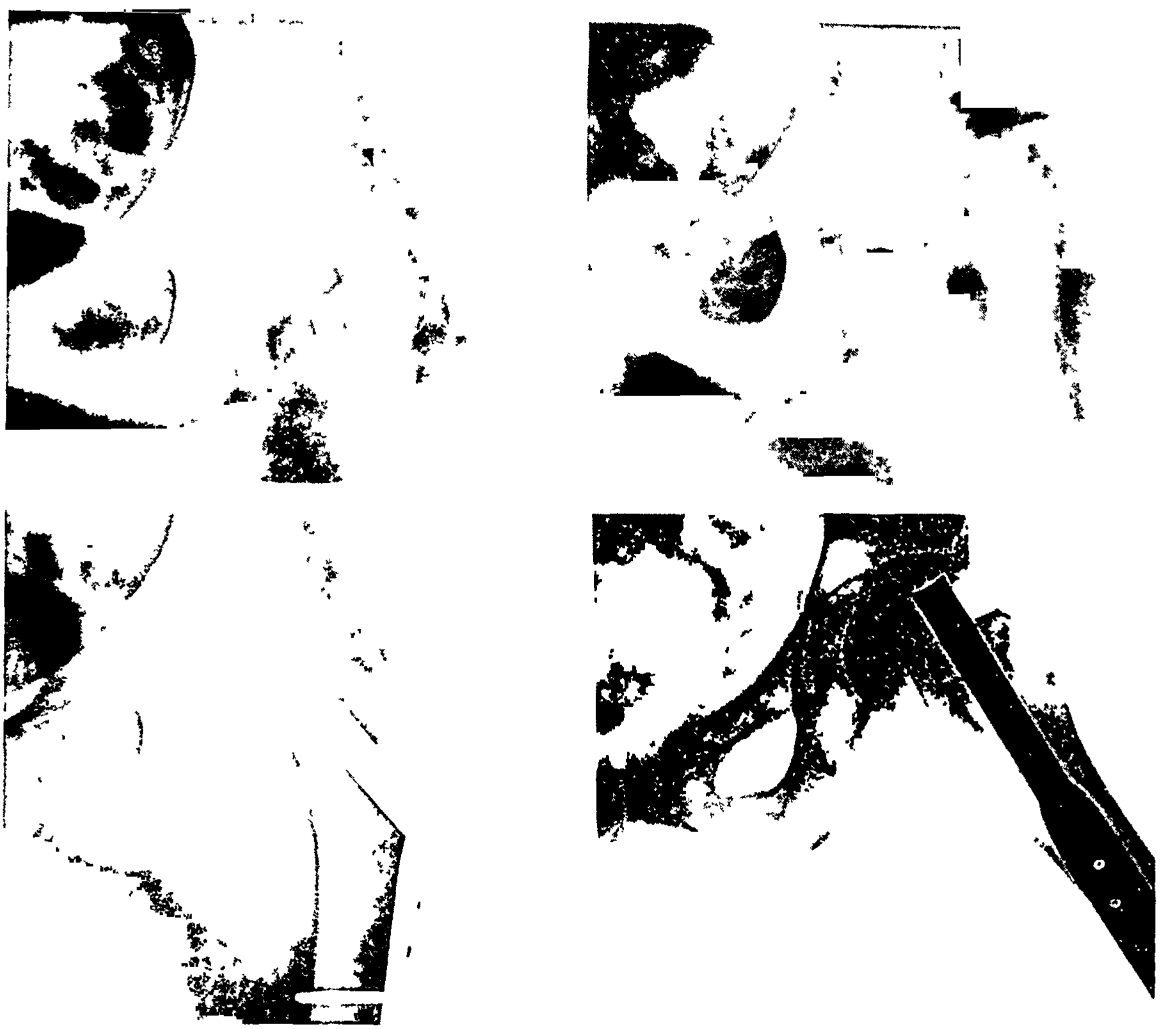

Fig 12—Patient H. C Films taken on day of injury (*upper left*) and two months after operation "Beak" broken off during reduction.

dell'articolazione coxo-femorale: nella figura si vedono pure le due zone di sicurezza subito al di sopra ed al di sotto della fovea capitis La superficie di sostegno della testa femorale varia naturalmente nei movimenti di adduzione o di abduzione: ma quella dell 'acetabolo rimane costante. Queste zone di sicurezza dovrebbero essere esattamente annotate, avendo le gambe del paziente leggermente abdotte dal normale angolo di allineamento durante la deambulazione.

5. Se il chiodo rimane vicino alla superficie anteriore del collo femorale, il legamento rotondo non viene offeso anche se il chiodo perfora la testa sul margine della fovea. Se possibile, e' preferibile che il chiodo sia diretto subito al si sopra o al di sotto della fovea

La figura 2 dimostra una posizione corretta del chiodo rispettivamente per una frattura transcervicale e sottocapitale: l'estremita' del chiodo e' infatti diretta appena al di sopra della fovea.

Nella figura 3 il chiodo e' invece nel centro del collo, diretto appena al di sotto della fovea

Una posizione piu' o meno posteriore della fovea e' costante in tutti i casi esaminati radiologicamente.

6. Un chiodo di 130° puo' esser diretto, di solito, subito al di sopro della fovea: un chiodo di 120° al di sotto. Nel fissare mediante viti la testa del chiodo all'asse femorale e' preferibile ottenere un leggero grado di valgismo: il va-

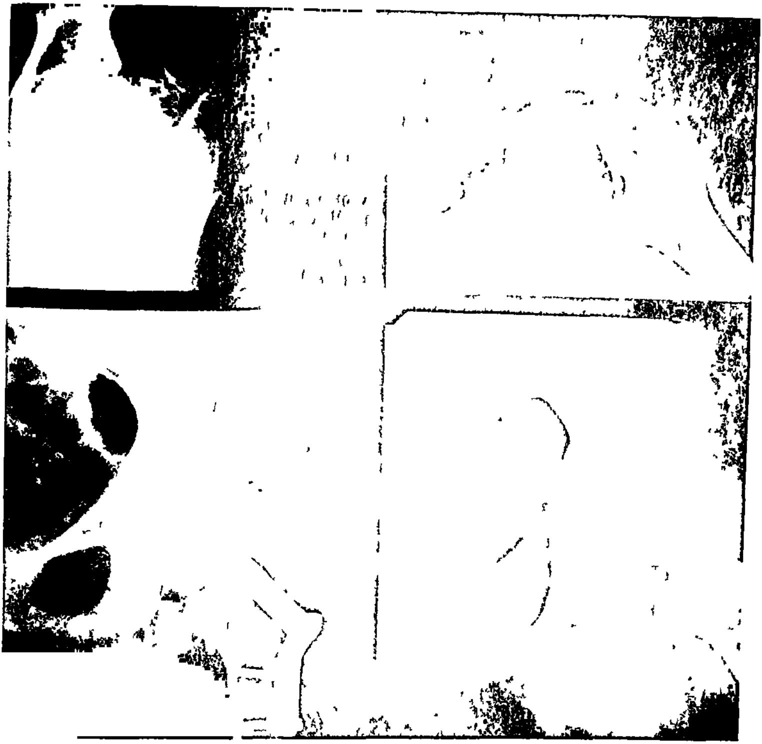

Fig 13 —Patient I D Films taken on day of injury (*upper left*) and one month after operation *Beak partially detached at time of fracture

rismo va evitato Le migliori probabilita di una perfetta unione si creano quando il chiodo forma un angolo retto con la sede della frattura

7 Nessun danno deriva dall'eventuale penetrazione del chiodo nella testa femorale e nell'acetabolo, qualora questo avvenga in una zona non di sostegno ma durante la convalescenza i movimenti dell'anca vanno ridotti ad un minimo Il chiodo viene rimosso quando una solida unione ossea si e stabilita i pazienti possono allora aumentare gradatamente i movimenti dell'arto

E' bene ricordare i seguenti punti fondamentali riguardo le manovre operative e post operative

(a) Le fratture vanno ridotte con accuratezza secondo la tecnica di Ledbetter facendo appello a delle buone radiografie antero posteriori e laterali

(b) Durante le manovre di riduzione avviene spesso [illegible] del cosidetto becco della porzione piu' bassa del collo. La necessita' di una correzione operatoria e di un'osteotomia e' oggetto di discussione.

(c) Se il frammento prossimale e' mantenuto fisso da 3 aghi o da 3 fili di guida mentre il chiodo viene spinto al di sopra di uno di questi, la rotazione ed il scivolamento del frammento verrano evitati.

(d) L'inserzione del chiodo consente una sufficente immobilizzazione dei frammenti.

(e) La deambulazione con grucce puo' essere consentita abbastanza precocemente, ma il pieno sostegno del corpo va dilazionato fino a che una perfetta saldatura della frattura sia dimostrabile radiologicamente (da 4 a 6 mesi).

La figura 4 e le figure successive dimostrano una soddisfacente guarigione delle fratture. L'A. ha operato con questa tecnica una serie consecutiva di 12 casi.

Altre 2 fratture del tipo transcervicale e verticale sono state successivamente operate, ma l'operazione data solamente da una settimans. I chiodi sono stati rimossi senza inconvenienti in alcuni dei pazienti operati dall'A.: negli altri cio' verra' fatto in seguito.

L'A. ammette che un giudizio definitivo non puo' essere formulato per questo metodo di cura delle fratture del collo femorale. Le ra-

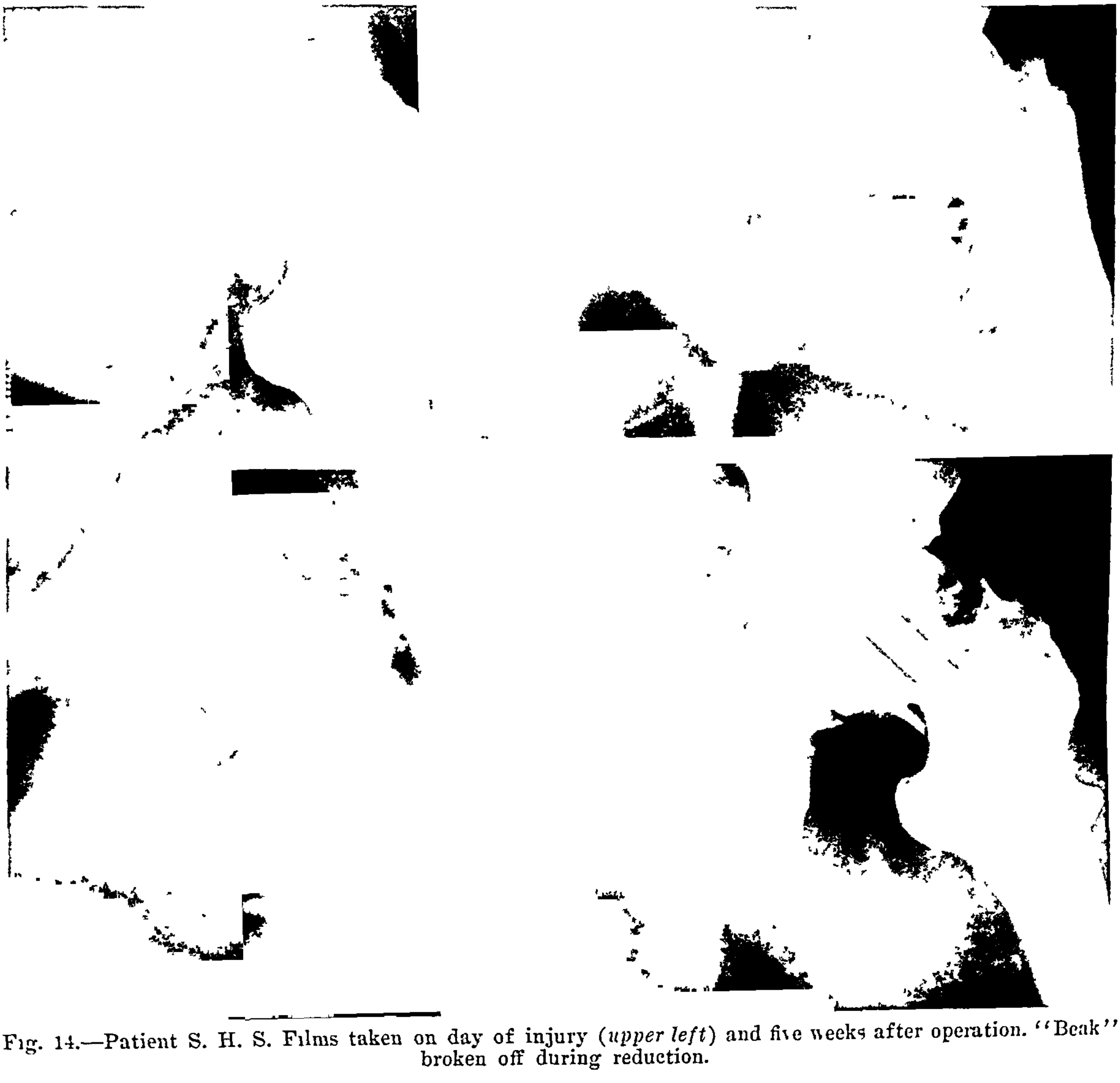

Fig. 14.—Patient S. H. S. Films taken on day of injury (*upper left*) and five weeks after operation. "Beak" broken off during reduction.

Fig 15—Patient M S Films taken on day of injury (*upper left*) and two weeks after operation Both intact in relation to hip Slight valgus

diografie riportate nell articolo sono pero abbastanza eloquenti esse dimostrano che la incertezze prognostiche che esistevano per talune forme di queste fratture sono state eliminate grazie ai contributi di F Pauwels Vano Gorder, James Dickson Bosworth Cleveland, Neer, McLaughlin

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Anomalous Opening of the Common Bile Duct into the Stomach

Report of a Case

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FAILURE to recognize variations and anomalies of the bile ducts has undoubtedly caused an appreciable number of surgical accidents many of them avoidable. The following case of anomalous termination of the common duct is reported for three reasons: (1) because the condition is exceedingly rare, (2) because the symptoms and diagnosis leading to its recognition were suggestive of duodenal ulcer, and (3) because it reemphasizes the importance of careful surgical exploration.

We begin with a brief review of the literature on anomalies of the common bile duct.

[illegible] listed 5 anomalies of the common bile duct: 1 Common bile duct arising directly from the gallbladder, with the hepatic duct joining directly into the gallbladder and the cystic duct absent. 2 Common bile duct emptying directly into the pylorus. 3 Common duct bifid, one limb opening into the pylorus and the other into the duodenum. 4 Bifid common bile duct, both limbs opening into the stomach. 5 Two common bile ducts, the left opening into pylorus and the right into the duodenum.

M[illegible] stated that anomalous biliary ducts occur in about 10 per cent of persons and that [illegible] the anomalous structures in man [illegible] normal arrangements in the lower animals.

[illegible] stated that the normal site of bile [illegible] the bream, a fresh water fish, is [illegible].

[illegible] and We[illegible], in their excellent review of the literature listed the following cases [illegible] ducts: 1 Laen[illegible] [illegible] a single common duct emptying [illegible] near the pylorus. 2 [illegible] the common duct was bifurcated, the upper duct emptying into the stomach and the lower into the duodenum. 3. A case described by Filippini, in which the duct emptied into the stomach through the pyloric ring. 4 Dimerbroek's case, in which there was a double common bile duct, both ducts emptying into the duodenum about a fingerbreadth apart. 5 Blasius' case, reported in 1674, in which there were separate entrances of the pancreatic duct and the common bile duct into the duodenum, and another case in 1667 similar to Dimerbroek's. 6. Boyden's case, in which the common bile duct was bifurcated and both parts emptied into the duodenum, the pancreatic duct joining the lower limb. 7 Gentile's case, in which two common ducts were present with outer and inner anastomosing ducts. The two common bile ducts had separate openings into the duodenum. 8 Kehr's case, reported in 1906, in which two common ducts were present but entirely separated, emptying into the duodenum close to each other. In 1912 Kehr reported a case in which the common duct had a septum and two separate openings into the duodenum. The lateral duct in this case contained a stone. 9 A case reported by Rodriques and Adriao, in which there were two common bile ducts throughout. Each duct was formed by two ducts, one from the quadrate lobe going to each.

REPORT OF CASE

H. K., a 34-year-old man, was admitted to the hospital Sept. 9, 1947, complaining that he was unable to retain solid food. He had had stomach trouble since the age of 19. A tentative diagnosis of peptic ulcer had been made on several occasions. He had been treated with diet, antispasmodics and antacid therapy, which gave him only partial relief. He consulted Dr. M. in August 1947. Roentgenograms were taken. The report was as follows: "He has been vomiting off and on for the past five weeks. The vomitus contains food which he has eaten as long as two or three hours previously. The vomitus is sour. At times there will be a little blood in the vomitus, and at other times there will be a brown substance something like coffee grounds. He has had a little, but not too much heartburn. Heavy foods seem to upset his stomach. He has recently been on a very soft diet, mostly milk and rice. Last time he vomited was last night. He took barium this morning at seven o'clock and has not vomited since. He has had pain in his stomach all day now for the past six hours. He has not been constipated. He has lost about 13 pounds (5.9 Kg.) of weight in the last four weeks.

"Fluoroscopic study of the chest shows no abnormality in the heart or the lungs. The esophagus is normal. Barium taken six hours previously has all left the stomach and is present in the cecum and the distal portion of the ileum. The stomach is fish-hooked in form and not lying in normal position in the abdomen. Fluoroscopic study of the stomach proper shows no evidence of ulceration or malignant change in the stomach. The pyloric sphincter opens, but there is irregularity of the whole bulb although barium does pass through this portion of the bowel. The descending portion of the duodenum is fairly large, and there is reverse peristalsis.

"From a roentgenologic standpoint this patient does have an ulcer of the duodenal bulb which is quite extensive in its involvement but which at the present time is not causing obstructive symptoms. I am of the opinion that the vomiting prob

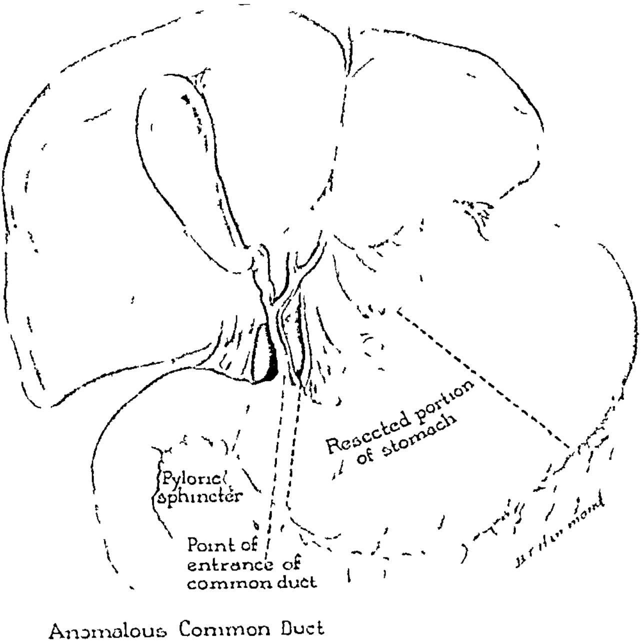

Fig. 1.—Artist's drawing of operative region, showing anatomic points of resection.

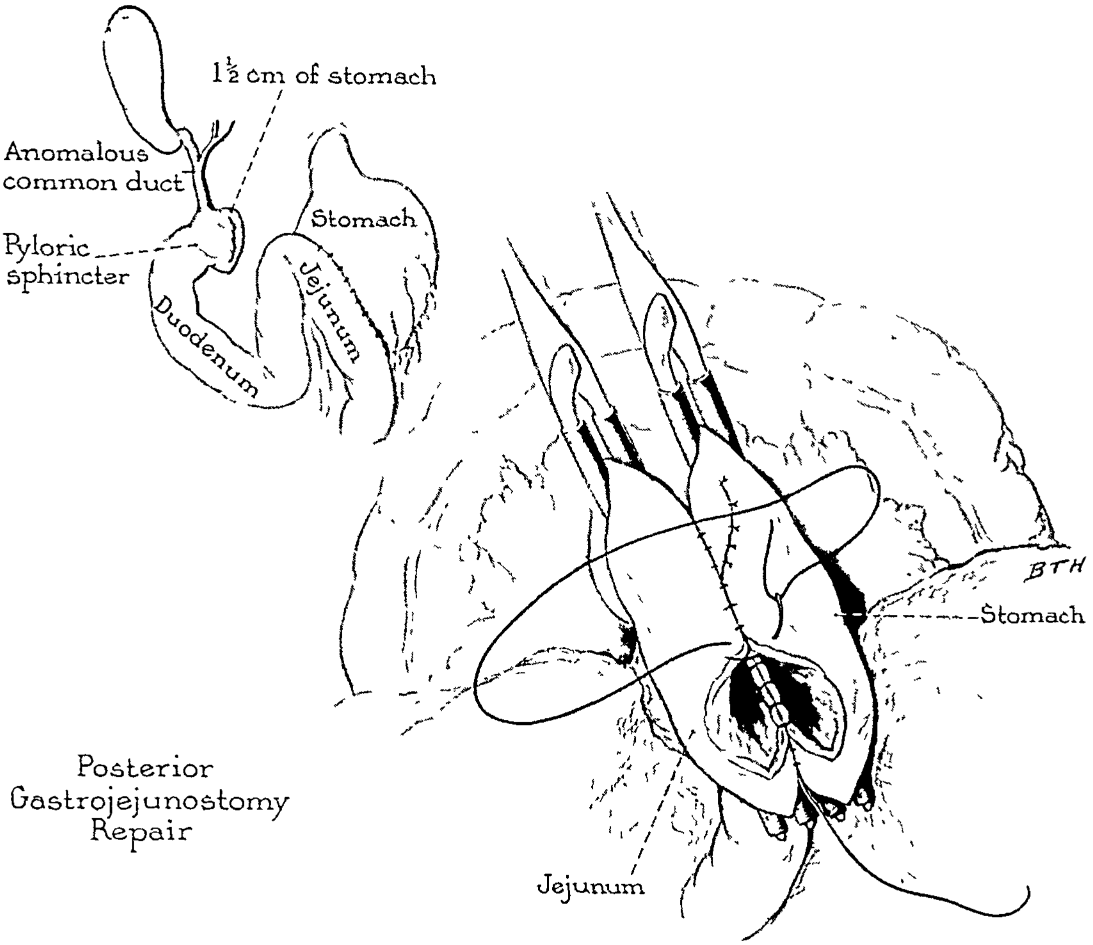

Fig. 2.—Operative technic (see text).

ably is due to irritation from the ulcer and not due to true obstruction. However, some heavy foods might conceivably obstruct the bowel where the liquids taken with the barium might pass through without any difficulty, as is the case today."

Antacid therapy was instituted, with lusyn before meals and gelucil after meals, but the treatment this time seemed to give the patient no relief. He was forced to cut down his intake to fluids only, and began to lose considerable weight. For this reason it was recommended that he come into the hospital for further study and probable surgical treatment.

Physical examination on admission to the hospital revealed the patient to be pale and underweight. He was about five feet five inches (165 cm.) tall and weighed 118 pounds (53.5 Kg.). He appeared nervous and anxious. The eyes, ears, nose and throat were essentially normal. The blood pressure in millimeters of mercury was 100 systolic and 70 diastolic. The heart rate was 80. The chest was within normal limits. Physical examination revealed a thin abdomen with prominent flaring of the costal margins. There was deep tenderness in the midepigastrium, about 2 fingerbreadths below the xiphoid. There was no spasm of the muscle, no splinting and no tenderness over the gallbladder area. The lower part of the abdomen was essentially normal. The impression was that of duodenal ulcer with partial obstruction of the pylorus due to inflammatory change and edema.

While in the hospital (September 9 to 14) the patient was treated by continuous suction and given intravenous injections containing large doses of vitamin B complex and vitamin C. He was also given vitamin K every other day. It was expected that with continuous suction most of the obstructive edema of the pylorus would subside enough in a few days to facilitate accurate handling of the duodenal structures. The patient's symptoms were practically relieved when the continuous suction was active. He was given two preoperative blood transfusions.

Operation was performed on September 15, with the patient under gas oxygen-ether anesthesia. A high right paramedian incision was made, and the peritoneum was entered for a distance of approximately 5½ inches (14 cm.). The stomach was palpated, as was also the duodenum, in an effort to find an area of induration to correspond with the suspected ulcer. This we were unable to do, and in view of the symptoms and the positive roentgen diagnosis, it seemed that further investigation was indicated. Accordingly a longitudinal incision was made ½ inch (1.2 cm.) proximal to the pyloric ring and carried upward for about 1½ inches (3.7 cm.). It was then noted that there was an opening just proximal to the pyloric ring, which was first interpreted to be a posterior perforating ulcer. When probed, however, it proved to be the opening of the common bile duct into the stomach, all completely proximal to the pyloric ring. Bile and a thinner, whitish fluid were exuded. The problem arose as to the significance of this observation in relation to the patient's symptoms. It seemed possible that, in the absence of any palpable ulceration, the symptoms certainly might be related to the fact that the biliary flow and probably the pancreatic flow emptied into the stomach instead of the duodenum. The lining of the pyloric end of the stomach was thin and appeared somewhat atrophic. The stomach was divided about 1.5 cm. proximal to the point at which the common duct entered the stomach, and the aperture was closed with two layers of continuous No. 000 chromic sutures, with several interrupted linen sutures to reinforce the second layer. About three-fifths of the stomach was removed, and a Polya type of repair with posterior gastroenterostomy was done. The peritoneum was closed with No. 00 continuous chromic sutures, No. 000 interrupted sutures to approximate the rectus muscle and No. 00 chromic sutures for the anterior fascia. Reinforcement was supplied by No. 0 chromic interrupted sutures. The skin was closed with fine cotton mattress "on edge" continuous sutures, and the wound was supported with four heavy silk sutures, Davey buttons being used for retention.

The course of the patient in the hospital after operation was entirely satisfactory. His blood pressure was maintained throughout the operation by infusions of 1,500 cc. of plasma, and his immediate postoperative condition was excellent. On the second night after the operation he was given 500 cc. of fresh blood. Continuous suction through a Levine tube was maintained for three days, and during this time he was given intravenous fluids, including ascorbic acid and B complex vitamins. On the morning of the fourth day the tube was withdrawn and the patient was allowed to begin taking sips of water, tea and gelucil. He progressed well and was taking light soft food on the fifth postoperative day; by the seventh day he was taking a soft, bland diet without difficulty. He was discharged home on September 24, apparently in excellent condition, and was instructed to continue his bland diet until otherwise instructed.

Pathologic Observations.—Grossly the specimen was a large segment of stomach exhibiting two broad and rather poorly defined areas approximately 4 by 4.5 cm., which showed a loss of rugae but no remarkable thickening of the walls. No papillary process or other typical ulcer was identified grossly. The pyloric ring was not positively identified.

Histologic examination revealed a considerable increase of the number of parietal cells in the mid-portion of the stomach, almost to the exclusion of the chief cells. This would suggest a considerable increase in hydrochloric acid secretion. Other portions, taken toward the pylorus, showed considerable thinning of the mucosa and were associated with narrow edged defects, but there was no evidence of positive inflammatory activity, particularly of the diffuse type sometimes associated with these and at other times occurring as isolated islands, small foci of low grade chronic inflammatory reaction or even scar tissue reaction. One such area extended to the muscularis of the submucosa. This indicates atrophy of the mucosa in this area, such as would develop subsequent to a prior broad ulceration associated with repeated pinpoint ulcerations, healing and in one case evidently penetrating to the muscularis. There was no evidence of present ulceration, polyposis, specific infection or malignant change. The pathologic diagnosis (Dr. W. E. B. Hall) was old healing ulcer of the stomach.

The patient was seen at frequent intervals after his discharge from the hospital. Except for slight drainage at the upper angle of the wound for a few days, he made a rather uneventful recovery. In one month after his discharge he had gained 15 pounds (6.8 Kg.), and eight weeks after the operation he went back to his work in a packing house. Since that time he has not cooperated in his follow-up visits, and our recent attempts to locate him have been unsuccessful.

SUMMARY

1. A case of anomalous opening of the common duct into the stomach is reported. [illegible] 2

other cases apparently entirely similar to this case are mentioned in the literature, so far as we are able to determine. We could find no details of either of these.

2. The relation of the anomaly to the symptoms presented by this case is uncertain, but it seems possible that it may have been at least a factor.

SOMMAIRE

Un cas d'ouverture anormale du Cholédoque dans l'estomac est rapporté Deux cas seulement, tout-à fait semblables, furent trouvés par l'auteur dans la littérature; l'auteur ne trouva aucun détail de l'un ou de l'autre de ces deux cas.

Les rapports de cette anomalie aux symptômes presentés par la malade sont incertains mais il paraît passible que ce fût un facteur.

ZUSAMMENFASSUNG

1. Ein Fall von abnormaler Muendung des Ductus choledochus in den Magen wird berichtet. In der Literatur werden. soweit wir feststellen konnten, anscheinend nur zwei aehnliche Faelle erwaehnt. Ueber keinen dieser beiden Faelle konnten wir Einzelheiten ausfindig machen.

RIASSUNTO

1. Descrive un caso di sbocco anomalo del dotto comune nello stomaco. Nella letteratura esisterebbero solo due casi consimili, di cui l'A. non e' pero' riuscito a rintracciare i particolari.

2. L'A. ritiene possibile un rapporto causale fra l'anomalia e l'insorgenza dei sintomi clinici.

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Internal Hernia as a Cause of Intestinal Obstruction

Report of Three Cases

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THE incidence of internal hernia is not great. Its occurrence as a cause of intestinal obstruction is even less, as evidenced by the large number of recorded cases in which the condition was discovered incidentally during laparotomy or at postmortem examination. However, acute intestinal obstruction secondary to an internal hernia is a formidable problem when it arises. Every surgeon who treats acute disease of the abdomen should be cognizant of the possibility in any given case that an internal hernia may be present, causing intestinal obstruction.

The purpose of this paper is to review the subject of internal hernia as a cause of obstruction and to present 3 illustrative cases.

Wangensteen[1] cited a report of 21 cases of internal hernia during an eighteen year period in Friedrichshain Hospital in Berlin during which 1,795 cases of external hernia were operated. He cited Guillame's observation of 400 cases of acute intestinal obstruction of which only 4, or 1 per cent, were cases of internal hernia. McIver[2] observed only 3 cases of internal hernia in 335 cases of acute intestinal obstruction, an incidence of 0.9 per cent. Mayo, Stalker and Miller[3] reported 39 cases of intra abdominal hernia treated surgically at the Mayo Clinic from 1910 to 1939. In 21 of these cases the condition originated postoperatively and in the other 18 it was due to congenital defects. In 1941 Hansman and Morton[4] made a thoroughgoing review of the literature and reported 467 cases of internal hernia, excluding those in which the hernia was secondary to a previous surgical procedure.

In striving toward a concise classification it is difficult to go beyond dividing the hernias into those occurring into or through a congenital fusion or rotation defect in the peritoneum and those occurring into or through a defect produced by an earlier surgical procedure.

Hansman and Morton[4] have made a revealing classification of hernias occurring through congenital defects including the incidence of each type of hernia observed in their review of 467 cases.

Paraduodenal	Left paraduodenal Right paraduodenal Infraduodenal	53%
Pericecal and terminal ileum	Pericecal Ileocolic Ileoappendicular	13%
Perimesenteric	Mesenteric Ascending mesocolon	8%
Foramen of Winslow		
Pelvic	Broad ligament (excluding those secondary to uterine suspension) Prevesicle	7%
Intersigmoid		6%
Miscellaneous	Through great omentum defect Behind aberrant middle colic artery Into rectum Back of pelvic peritoneum Into properitoneal fat low on anterior abdominal wall Back of vitelline duct Through falciform ligament of liver	5%

Obviously, if hernias secondary to surgical procedures were included in this large series the percentages would vary considerably. An explanation of some of these types is to be found in Hansman and Morton's[4] article.

The usual types of internal hernias that follow surgical procedures are not nearly so numerous. After posterior gastroenterostomy, failure of the transverse mesocolon to remain attached to the stomach may result in an aperture through which a loop of small intestine may herniate and become obstructed. Mayo, Stalker and Miller[3] reported 6 such hernias. The foramen formed by the loop of jejunum stretched from the duodenojejunal junction to the site of a gastrojejunostomy, either anterior or retrocolic, may serve as a site of herniation. The last mentioned authors

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reported 4 such hernias, 2 of the anticolic and 2 of the retrocolic type. The same authors referred to 2 hernias occurring through the aperture lateral to a loop of colon brought out for colostomy. Goode and Newbern[5] reported 9 and Prulang[6] reported 14 cases of intestinal obstruction resulting from herniation of bowel through defects in the broad ligaments of the uterus after Baldy-Webster suspension of that organ. Any site at which an abnormal opening is produced by an intra-abdominal operation or by an inflammatory residue may conceivably serve as a site of herniation and obstruction of the bowel.

The cause of the condition is obviously composed of two factors: (*1*) the presence of an aperture and (*2*) the occurrence of a situation causing a loop of bowel to enter the aperture and become strangulated. The formation of an aperture by surgical measures requires no explanation. The presence of an aperture serving as a hernial site in persons who have never undergone previous surgical treatment has been discussed in virtually all articles on internal hernia. The consensus is that such mesenteric defects are congenital. This is suggested by the occurrence of internal hernias in infants, the frequent discovery of such defects incidentally at autopsy and laparotomy, and the complex embryologic processes involved in formation of the mesentery, which allow frequent opportunities for variation. Cutler and Scott[7] point to the occurrence of multiple fenestrations in the mesentery of the goose as additional evidence that such defects are congenital.

The precipitating cause of internal hernia cannot be determined by pressure variations in the abdominal cavity, although various authors have pointed to internal hernias occurring after a difficult bowel movement, after straining to open a window, or after an abnormally large meal. Obviously, the pressure at any one point in the abdomen is the same as that at any other point in the cavity at the same time. Because of the relatively resistant walls formed by the abdominal parietes and the absence of air-tight compartments in the abdominal cavity, any increase of pressure in one part of the abdomen is coincidentally transmitted to all other parts of the cavity. It seems most probable that a knuckle of bowel enters the aperture by chance during periods of abnormal intestinal motility and that peristaltic action and accumulation of gas in the involved loop carries the loop through to the point of intestinal obstruction.

Individual consideration of three particular types of internal hernia producing intestinal obstruction, together with an illustrative case of each type, is presented here.

Hernia Through a Defect in the Great Omentum.—The rarity of herniation of the bowel through an aperture in the great omentum is attested by the fact that Hansman and Morton[1] noted but 5 such cases in their review of 467 cases of internal hernia. Martzloff[8] in 1930 reviewed 15 cases found in the literature from 1840 to 1929. He added what he believed to be the sixteenth recorded case. In his review the following data were disclosed: The age of the patients varied from 12 to 82 years. There were 3 female and 9 male patients; of 3 the sex was not known. A portion of the small bowel was involved in the hernia and strangulated in 14 cases; the colon (transverse and descending portions) was involved in 1 case. In all cases except 1 there were symptoms and signs of acute intestinal obstruction. In the single exception a diagnosis of perforated gastric ulcer was made. In 3 cases the outcome was not known. In another 3 cases the patients were not operated on and the diagnosis was made at autopsy. Eight patients were operated on and recovered. In 1 operative case the cause of obstruction was not found at laparotomy and the diagnosis was made only at autopsy. In Martzloff's case[8] the patient was a 24-year-old white man who was operated on because of a clinical diagnosis of possible appendicitis. At operation no cause of abdominal distress could be detected until the greater omentum was drawn down over the intestine preparatory to closing the peritoneal cavity. It was then noticed that two holes were present in the omentum and that through one a purplish-pink loop of ileum, about 15 cm. in length, was protruding. The ileum was easily reduced, the apertures in the omentum were closed and the patient recovered uneventfully.

Sanes and Postoloff[9] in 1944 reported 1 case of strangulation of the small intestine due to prolapse through an aperture in the great omentum. These authors noted Martzloff's 15 cases,[8] found records of 4 patients operated on for this entity from 1932 to 1942, and added their own case to the small series.

Our own experience is indicated by the following case.

CASE 1.—A 29 year old white man, an iron worker, entered the Veterans Hospital in Salt Lake City at 5 a.m. on Aug. 26, 1949 complaining of abdominal pain. He had felt perfectly well until he awoke from a sound sleep at 2:30 on the morning of admission, with a bloated feeling in the abdomen. He took two teaspoonfuls of "sal hepatica" and approximately thirty minutes later had a severe and gradually increasing periumbilical pain. This pain, according to the patient's account increased to great severity, and he rolled and turned in bed without relief. The pain was constant, accompanied by persistent nausea and two episodes of vomiting. A normal bowel movement had occurred the day before admission but no bowel movement or passage of flatus had occurred since. A carefully taken history failed to reveal anything of further significance except that the patient had been discharged from the army as psychoneurotic.

Physical examination revealed him to be well developed and strongly muscular. He was writhing and turning in obvious acute distress and complaining bitterly of abdominal pain. The rectal temperature was 99 F., the pulse rate 112, and the blood pressure 130 systolic and 100 diastolic. Slight generalized abdominal distention was observed. The abdomen was voluntarily held rigid. On relaxation there was a questionable amount of generalized muscle resistance. Marked tenderness was present in the epigastrium and in the right lower quadrant. Pressure over the epigastrium produced pain at McBurney's point. No masses or organs were palpable. The bowel sounds were of normal intensity and pitch but of somewhat decreased frequency.

The initial impression of the admitting physician was (1) acute pancreatitis, (2) possible acute appendicitis, and (3) possible acute intestinal obstruction.

Eleven mg. of morphine followed in forty-five minutes by a second dose of 16 mg. appeared to give little relief. The patient vomited a large number of whole beans.

The white blood cell count was 39,000 per cubic millimeter, with a marked shift to the left. The urine showed a 3 plus sugar content and no acetone. The value for blood amylase was 35 mg., and that for blood sugar 310 mg., per hundred cubic centimeters. The carbon dioxide combining power was 35 per cent. The hematocrit reading was 56 per cent and the value for hemoglobin 19.4 Gm. A flat plate of the abdomen revealed a lattice of accumulated gas in several loops of small bowel. This was located in the left upper quadrant. A film taken five hours later showed a further accumulation of gas in the same region without progression into the colon.

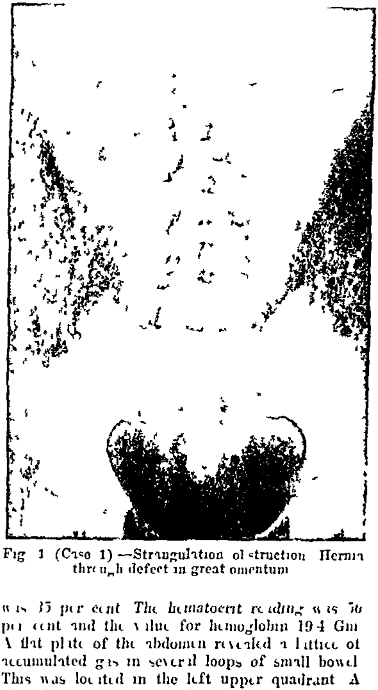

Fig. 1 (Case 1).—Strangulation obstruction. Hernia through defect in great omentum.

The patient was watched carefully in the ward with considerable concern for the hyperglycemia and glycosuria. Laboratory determinations of the pertinent values were repeated and verified. The medical consultant did not believe the patient to be in a state of diabetic acidosis. Repeated examinations of the abdomen revealed gradually developing distention, together with diminution in frequency and increase in pitch of the bowel sounds. The patient was taken to the operating room at 1 p.m., eight hours after admission, with the diagnosis of acute obstruction of the small intestine possibly due to an internal hernia. At this time the abdomen was tightly distended and tender, and peristaltic action of the bowel had ceased. Two thousand cc. of physiologic solution of sodium chloride had been given intravenously prior to operation.

Twelve mg. of pontocaine, preceded by 50 mg. of ephedrine, was administered as a spinal anesthetic. The patient became severely depressed, and the blood pressure, which had been 100 systolic and 80 diastolic before administration of the anesthetic, became unobtainable. Both lower extremities were wrapped with compression bandages, and during the next two hours 500 cc. of irradiated plasma and 1,000 cc. of physiologic solution of sodium chloride were administered intravenously. The blood pressure returned at 80 systolic and 60 diastolic and gradually rose to levels of 110 and 70 respectively. The patient was returned to the ward. One thousand cc. of whole blood was administered to allow further stabilization.

At 10 p.m., seventeen hours after admission and nineteen and one-half hours after onset of symptoms, the patient was returned to the operating room. With the continuous catheter spinal technic an anesthetic was given without untoward results. Blood and saline solution were administered by two routes. Laparotomy was performed through a right paramedian incision extending above and below the umbilicus. Upon opening the abdomen a large amount of bloody serous fluid (estimated at 2,000 cc.) spilled from the abdomen. Another measured amount of 2,500 cc. of similar fluid was aspirated. Distended loops of small bowel contained dark hemorrhagic fluid. It was estimated that this represented another approximate 1,000 cc. of plasma loss. Moderately distended loops of jejunum were present in the upper part of the abdomen, and a dark, hemorrhagic loop of small bowel was present in the lower part. Examination revealed that approximately the distal 6 feet (182.88 cm.) of ileum had herniated through a small ringlike aperture near the edge of the great omentum. In addition, this loop of small bowel had undergone 180-degree volvulus, resulting in obstruction and strangulation of the small bowel. The constricting ring was severed and the bowel packed with warm saline lap pads while the anesthetist administered 100 per cent oxygen. This was continued for approximately forty minutes. All except the proximal 18 inches (45.72 cm.) of strangulated bowel regained its contractility and apparent viability. This segment remained dark, lusterless and flaccid. Accordingly, it was resected, finger pressure being used to control the intestinal contents. A two-layer interrupted silk open anastomosis of the end-to-end type was done. The contractility, vascularity and lumen patency of the remaining bowel appeared good. A gastric tube was manipulated from the stomach into the duodenum. The abdomen was closed and the patient returned to be with a blood pressure of 120 systolic and 90 diastolic. He was in fair general condition. Five hundred cc. of whole blood, 500 cc. of plasma, and 1,000 cc. of 5 per cent dextrose in saline solution had been administered during the operation.

The postoperative course was uneventful. Continuous gastric and intestinal aspiration, penicillin and streptomycin therapy and intravenous fluids and blood were employed. Peristaltic sounds were present thirty-six hours after the operation, and black, liquid stools were passed on the third postoperative day. The sutures were removed on the thirteenth day and the patient discharged a day later. Repeated blood sugar determinations, dextrose tolerance tests and urinalyses done before discharge gave normal results. The patient was seen one month later and stated that he had been well since leaving the hospital.

This case was of great interest because of the rapidly fulminating course of the lesion and the occurrence of hyperglycemia (blood sugar, 310 mg. per hundred cubic centimeters), which caused considerable confusion in establishing a diagnosis and planning a course of treatment. The hyperglycemia was discovered by a watchful laboratory technician in the process of doing a serum amylase determination. The urine showed a 3 plus reaction for sugar but no acetone. The carbon dioxide combining power (35 per cent) indicated that acidosis was not present in sufficient degree to produce the extreme peritoneal irritation observed. The subsequent development of events seem to indicate that the hyperglycemia was an indication of severe trauma and impending shock.

It seemed obvious to us, after making an estimation at operation of a 5,000 cc. plasma loss, that the patient had compensated to an absolute maximum. Replacement of tissue fluids prior to the first attempt at surgical intervention had been grossly inadequate. Had we not fallen into this error and underestimated the gravity of the situation, the patient might have tolerated the first spinal anesthetic. Operation at this time might have spared him a resection of the small bowel.

Davidson and his associates[10] in 1946 published a report on abnormal biochemical changes in patients with severe, acute medical illnesses, with and without peripheral vascular failure. These authors reported disturbances of carbohydrate metabolism, including hyperglycemia, occurring in the shock syndrome. Four of the patients died in peripheral vascular collapse from the following diseases respectively: meningitis, dissecting aneurysm, gastrointestinal hemorrhage and barbiturate poisoning. Shortly prior to death each of these patients showed the following levels of blood sugar, all hyperglycemic: 234, 332, 552 and 370 mg. per hundred cubic centimeters respectively. None of these patients had evidence of diabetes or of any other disease known to disturb carbohydrate metabolism. Four other patients, who showed less severe degrees of hyperglycemia, subsequently recovered from their illnesses and showed no abnormalities of carbohydrate metabolism after recovery.

In a recent publication Beecher[11] has published data indicating that the blood sugar level appears to rise significantly both with increase in blood loss and with increase in severity of shock. His data were obtained from wounded men arriving at a forward hospital during the last war. With 80 to 90 mg. per hundred cubic centimeters serving as a norm, Beecher noted that the value for blood sugar averaged 134 mg. per hundred cubic centimeters in wounded men who showed no shock to 202 mg. in men who showed severe degrees of shock. From zero to six hours after injury the blood sugar value averaged 182 mg., seven to twelve hours after, 161 mg., and thirteen to twenty-four hours after, 144 mg. Soldiers who showed blood loss from 0 to minus 5 per cent had an average blood sugar level of 143 mg., and the elevation varied proportionately with increase in the amount of blood loss until men who had lost 40 per cent or more of blood volume showed an average blood sugar value of 194 mg. This author stated, "Presumably the elevation in blood sugar level is due to mobilization of liver glycogen following adrenal activity, and probably it reflects the emotional and physical stress the individual has experienced."

In 1944 Svante Annersten,[7] of Uppsala Medical School (Sweden), published an interesting and pertinent article entitled *Preparedness for Postoperative Shock*. This author deplored the fact that all the signs indicating a diagnosis of shock occur after shock is well established. In a search for a criterion upon which to diagnose impending shock, blood sugar values were determined for 40 patients after major surgical procedures. The blood sugar level in all cases was elevated an hour after the operation. The average preoperative level of blood sugar was 100 mg. per hundred cubic centimeters, the average postoperative level 180 mg. Annersten stated that in patients who later showed signs of shock the blood sugar level rose more rapidly, rose to higher levels, and persisted at high levels as long as one or two days. Patients who showed such variations in the postoperative blood sugar level were treated for shock. Data on the individual cases are not given. It is suggested that blood sugar determinations be utilized to diagnose impending shock.

Our purpose is not to establish a positive relation between shock and hyperglycemia. However, by deduction from the references just cited and correlation of laboratory and clinical data in our single case, we believe it can be presumptively stated that the occurrence of hyperglycemia in association with an acute fulminating disease indicates a severe degree of physiologic upset and impending shock. The physiologic trauma of an established safe spinal anesthetic was sufficient to throw our patient into extreme peripheral vascular collapse. Laparotomy some hours later revealed that approximately 5,000 cc. had been lost from the patient's effective circulation into the peritoneal cavity. It is our impression that the hyperglycemia was an indication of the catastrophic nature of the disease. Had we been aware of the significance of this abnormal observation, the difficulties encountered might have been anticipated and handled more expeditiously.

Hernia Through a Defect in the Mesentery.—In Hansman and Morton's review of 467 cases[4] there were 52 cases of transmesenteric hernia. Fourteen patients had defects in the ileocecal mesentery, and 38 had defects at higher levels in the mesentery of the small bowel. Cutler and Scott[8] reported 2 new cases and reviewed 50 cases from the literature on transmesenteric hernias. In 35 of the 50 cases reviewed the defect was in the ileocecal mesentery and was usually round or oval, with smooth, rounded peritonealized edges. There was no significant difference in sex incidence. The age of the patients varied from 4 days to 73 years.

In both cases reported by Cutler and Scott[7] the patients were children, aged 6 years and 21 months respectively. In both the disease ran a fulminating course, with symptoms of abdominal colic, vomiting and obstipation. Both were operated upon and relieved of small bowel hernia through the ileocecal mesentery. The lapse of time from onset of symptoms to operation in each case was under sixteen hours, and both patients recovered.

The clinical picture in the 52 cases considered by these authors was that of acute intestinal obstruction. Occasionally a palpable mass was present in the abdomen. In 62 per cent of the 50 patients gangrenous bowel was present, with symptoms of 6 hours' to 11 days' duration.

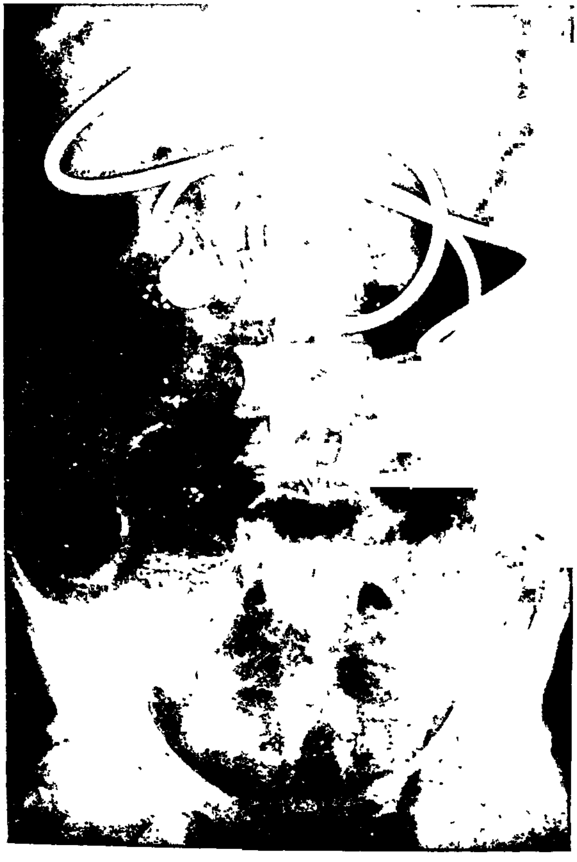

Fig. 2 (Case 2).—Hernia into mesenteric defect. Radiopaque substance visible in obstructed bowel, taken prior to patient's admission to hospital.

Case 2.—A 42-year-old white man was admitted to the Veterans Administration Hospital on May 1, 1948, with the presenting complaints of cramping midabdominal pain of four days' duration, repeated vomiting and obstipation.

The onset of pain occurred while the patient was at rest at home. He was seen soon after the onset of pain and given a "hypo." His attending physician had treated him in 1942 for perforated peptic ulcer and had told him that this pain was associated with the ulcer. Repeated hypodermic injections were given for control of the pain. The patient restricted himself to taking liquids by mouth, but vomited several times during the four-day period prior to admission. A normal bowel movement had occurred on the day of onset of the pain, but no stools or flatus had been passed since. The symptoms persisted for the four days prior to admission, with varying degrees of intensity. The pain was referred to the lower part of the abdomen and the periumbilical region but had no definite localization and did not radiate. The patient was referred to this hospital by his physician.

Physical examination revealed him to be well nourished and apparently in no acute distress. The temperature was normal, the pulse rate 90 and the blood pressure 118 systolic and 72 diastolic. The examination gave negative results except for the abdomen, which was slightly distended, rising 2 cm. above the xiphopubic line. It was generally soft and nontender. Peristalsis was markedly hyperactive, and the bowel sounds were slightly high pitched.

The laboratory revealed normal urine, a hematocrit reading of 40, and a leukocyte count of 9,000 per cubic millimeter of blood. A flat plate of the abdomen showed a few loops of jejunum filled with gas. A small amount of gas was present in the colon also.

An initial diagnosis of partial obstruction of the small bowel was made, and a regime of "nothing by mouth," intestinal decompression with a Cantor tube, intravenous administration of fluids and penicillin therapy was instituted. The patient's condition was carefully observed over the next sixty hours. On May 3 the temperature was 99.6 F., the pulse rate 100 and the respiratory rate 20. The abdomen was more distended than at the time of admission. The abdomen had remained soft but was generally tender. Peristaltic sounds occurred at a rate of 30 to 40 per minute; these were high pitched, and occasional metallic tinkles were heard. A roentgenogram of the abdomen revealed the Cantor tube to be in the jejunum. There was a moderate increase in the amount of gas in the small bowel. In addition to the loops of jejunum described, several gas-distended loops of ileum were visible.

On May 3 at 2 p.m., sixty two hours after admission and seven days after the onset of symptoms a laparotomy was performed with the patient under general anesthesia. Distended loops of small bowel bulged into the wound. The terminal part of the ileum was identified and followed proximally until the area of obstruction was found. About 2 feet (60.96 cm.) from the ileocecal valve the ileum dipped into the right lower quadrant and into an abnormal peritoneum lined pouch which was limited posteriorly by the right iliac vessels on the right side by the colon and the associated peritoneal reflection and anteriorly by the radix mesenterii. On closer inspection the abnormal pouch seemed to be the result of an embryologic fusion failure of the radix mesentery of the terminal part of the ileum. The loop of ileum incarcerated in this pouch was removed without difficulty and was definitely viable. The defect in the root of the mesentery was of such size that closure not only was not necessary but seemed unfeasible with great vessels forming the posterior wall.

The postoperative course was uneventful and the patient was discharged on the eighteenth postoperative day. He has been seen recently and states that his general health has been good. There has been no recurrence of abdominal pain.

This patient had suffered the calamity of a ruptured peptic ulcer six years prior to his admission to this hospital. Considering this fact, it was thought that the small bowel obstruction might well be attributed to intra abdominal adhesions or to a combination of adhesions and obturation. Partial small bowel obstruction from such a cause frequently responds to conservative therapy. It was on this basis that the conservative regime described was used. After sixty hours' trial the disease had progressed despite treatment. The general physiologic condition had been improved and decompression had kept the bowel in good condition. Laparotomy was essential at this time.

The hernia in this case is somewhat difficult to classify. It did not meet the requirements of the pericecal, ileocolic or ileoappendical hernias. There appeared to be a fusion defect in the mesentery of the terminal portion of the ileum. The defect involved only the inferior leaf of the mesentery, the superior leaf remaining intact and forming the sac that enveloped the herniated loop of ileum.

Hernia Through the Foramen of Winslow.—Hernia through the foramen of Winslow differs from the two types of hernia already discussed in that it occurs through a normal aperture rather than through a congenital defect. This semicircular orifice, located about 5 cm. to the right of the first lumbar vertebra, is bounded anteriorly by the lesser omentum containing the portal vein, hepatic artery and common bile duct, posteriorly by the inferior vena cava, above by the caudate process of the liver and below by the first portion of the duodenum.

In 8 per cent of Hansman and Morton's series[12] the hernia occurred through the foramen of Winslow. Ullman[13] in an excellent review in 1924 summarized 29 cases from the literature and added 1 of his own. In 1929 Douglas[14] reported a case before the New York Surgical Society in which the diagnosis was made preoperatively by roentgen study with the aid of a bismuth contrast meal. At operation on the following day no hernia was present, but a 10 cm. loop of ileum showed narrowed compressed areas at each end. It was assumed that the hernia had been spontaneously reduced prior to operation. In 1945 Hollenberg[15] reported another case in which the diagnosis was made preoperatively with the aid of a barium meal and enema. This patient died on the fourteenth day after the hernia had been surgically reduced.

Ullman's review,[13] which covered a hundred year period from 1824, revealed the following data. The age of patients involved varied from 5 to 66 years. There were 5 female and 20 male patients, of 5 the sex was not known. The small intestine herniated into the lesser sac in twice as many instances as did the large intestine. In 10 instances the diagnosis was made at autopsy. Twenty patients were operated on; of these 11 died during the postoperative course. Ullman noted that in 11 of the 30 cases epigastric or periumbilical swelling developed soon after the onset of symptoms. At that date, Ullman stated, the preoperative diagnosis of hernia of the foramen of Winslow had never been made. It is our opinion that the establishment of a preoperative diagnosis by the two authors mentioned does not represent an advancement, since such methods necessarily demand delay in therapy and possible damage to a diseased bowel.

Fig. 3 (Case 3).—Obstruction due to hernia through foramen of Winslow. Closed bowel loop through foramen visible at tip of Levine tube.

Case 3.—At 1 a.m. on Aug. 24, 1947, a 25-year-old white woman was admitted to the emergency service of Wesley Memorial Hospital, Chicago. The patient complained of severe cramping abdominal pain of sudden onset and also of vomiting. At 10 p.m., three hours prior to admission, she had eaten a meal of chop suey. At midnight, one hour prior to admission, she had been seized with severe cramping pain across the epigastrium. This pain traveled through to the back, below the right scapula. In the hour immediately prior to admission there had been two episodes of vomiting. The vomiting consisted of food and "bile." The remainder of the history was noncontributory.

Physical examination revealed the patient to be well developed and well nourished but in acute distress. The temperature, the pulse rate, the respiratory rate and the blood pressure were within normal limits. Abnormal observations were limited to the abdomen, which was scaphoid; slight muscle resistance and tenderness were elicited in the right upper quadrant. The bowel sounds were normal in both frequency and pitch.

The leukocyte count was 10,200 per cubic millimeter of blood, and the urine was normal. A diagnosis of acute biliary colic was made, and conservative treatment was instituted. This consisted of continuous gastric suction, the withholding of anything taken by mouth, parenteral feeding and the administration of morphine and atropine.

The patient was next examined at 10 a.m., nine hours after admission. At this time she complained that the pain was more severe and had become continuous. Examination revealed the abdomen to be moderately distended (to about 1 cm. above the xiphopubic line). Tenderness and muscle resistance in the epigastrium and the right upper quadrant were increased over that elicited on the previous examination. Auscultation revealed the bowel sounds to have decreased in frequency and to have assumed a definitely higher pitch, with occasional metallic tinkles. Careful questioning indicated that the patient had passed no stools or flatus since the onset of the illness.

A flat plate of the abdomen at this time confirmed the impression of small bowel obstruction. A lattice of distended loops of small bowel was visible.

At noon, eleven hours after admission and thirteen hours after the onset of the illness, a spinal anesthetic was administered and the abdomen explored through a right paramedian incision. Collapsed loops of ileum were picked up and followed proximally. The collapsed bowel led to the upper part of the abdomen and was seen to pass anterior to the omentum and the transverse colon. It was then realized that the circumstances were unusual. By gentle traction a 6-inch (15 cm.) loop of small intestine was freed from the foramen of Winslow. The loop, estimated to be 8 feet (243.84 cm.) proximal to the ileocecal valve, showed the effects of constriction, and the serosa was covered with petechial hemorrhages. The serosal luster was normal, and the loop was definitely viable. The foramen of Winslow was larger than normal and readily admitted 2 fingers. The foramen was not closed.

Postoperatively, continuous gastric suction and intravenous feedings were carried out for two days. On the third postoperative day the patient tolerated a liquid diet. She was discharged from the hospital on September 5, the eleventh day after operation.

Diagnosis and Treatment.—The diagnosis and treatment of internal hernia is the diagnosis and treatment of intestinal obstruction with the potentiality of bowel strangulation. Discussion of the management of intestinal obstruction is beyond the scope of this paper. However, in any given case of intestinal obstruction in which the causative factor is not discernible, internal hernia should be considered. A vague mass or a palpable swelling in the abdomen may occur, as several authors have mentioned. Laboratory data is of little help in making a specific diagnosis of internal hernia. Roentgenograms of the abdomen show that the usual lattices of distended loops of bowel may be closely held together as though in a sac (Alexander[16]). Regardless of all studies and deductive processes, the final diagnosis will usually be made at laparotomy. Knowledge of the condition and its possibilities will be appreciated by the surgeon at this time.

During the period of establishing a diagnosis, with the unavoidable delay of obtaining roentgenograms, awaiting laboratory reports and pursuing the necessary mental processes of diagnosis, the time need not be wasted. The condition of the bowel can be stabilized or improved by decompression with a Miller Abbott tube or a Cantor tube. The general physical condition can be guided toward normal by the use of computed amounts of electrolytes, proteins and blood. By observation, a more accurate estimate of the condition of the patient and the status of his disease may be obtained. With such measures the lapse of time from admission to the hospital to entrance to the operating room, if not excessive, becomes an asset rather than a liability.

Operative treatment in a given case, with the numerous possible variations of internal hernia, can be determined only by the judgment and technical ability of the surgeon in charge.

SUMMARY AND CONCLUSIONS

Internal hernia as a cause of intestinal obstruction is rare. Nevertheless, the fulminating course of this condition and the disastrous results of delay in treatment demand that every surgeon who treats acute disease of the abdomen be aware of its possible presence.

A classification and brief description of types of internal hernia is given. Three illustrative cases of internal hernia are presented, including a case of hernia through a defect in the great omentum, associated with the unusual feature of hyperglycemia. This feature can be logically explained only by the assumption that large amounts of blood sugar were mobilized as a maximum physiologic attempt to combat sudden protein loss and impending shock. A case of herniation of the ileum through a defect in the ileocecal mesentery and another of hernia into the foramen of Winslow are also presented, with comments on these particular types of hernia.

The diagnosis of internal hernia should be considered in any case of intestinal obstruction in which the cause is not evident. The time required to establish a diagnosis should be utilized to improve the local condition of the distended bowel and the general condition of the patient.

SOMMAIRE ET CONCLUSION

Il est rare que la hernie interne détermine l'obstruction intestinale. Néanmoins, dans cette condition le retard du traitement approprié est si desastreux que le chirurgien qui s'occupe des maladies aigues de l'abdomen doit songer à la presence possible de cette condition. L'auteur donne une classification et une description brève des types de hernies internes. Trois cas sont présentés: un cas de hernie à travers un defaut de l'epiploon associé avec hyperglycémie. Cette hyperglycémie peut être expliquée seulement par l'assumption de la mobilisation de grandes quantités de sucre sanguin pour combattre physiologiquement la perte soudaine de proteine et par l'imminence du choc. Un cas de hernie de l'ileon à travers un défaut du mésentère iléocécale et une autre hernie à travers le trou de Winslow. L'auteur discute ces differents types d'hernies.

Le diagnostic de l'hernie interne doit être considéré dans tous les cas d'obstruction intestinale dont la cause n'est pas evidente. Le temps employé pour établir le diagnostic doit être utilisé pour améliorer les conditions locales de l'intestin distendu et l'état général du malade.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Ein innerer Bruch als Ursache eines Darmverschlusses ist ein seltenes Vorkommnis. Nichtsdestoweniger ist es wegen des heftigen Verlaufes der Erkrankung und angesichts der katastrophalen Folge einer Verzögerung in

der Behandlung notwendig, dass jeder Chirurg, der akute Baucherkrankungen behandelt, sich einer solchen Moeglichkeit bewusst ist. Es wird eine Einteilung und eine kurze Beschreibung von Typen innerer Brueche gegeben. Drei erlaeuternde Faelle von innerer Hernie werden dargestellt, einschliesslich eines durch eine Oeffnung im grossen Omentum erfolgten Bruches, der mit dem ungewoehnlichen Bilde einer Blutzuckererhoehung einherging. Dieses Symptom kann logisch nur durch die Annahme erklaert werden, dass als aeusserster physiologischer Versuch, ploetzlichen Eiweissverlust und drohenden Shock zu bekaempfen, grosse Mengen von Blutzucker mobilisiert wurden. Ein Fall einer Ileumhernie durch eine Oeffnung im illeocecalen Mesenterium und ein weiterer durch das Foramen von Winslow werden ebenfalls beschrieben und als besondere Bruchtypen kommentiert.

Die Diagnose einer inneren Hernie sollte stets in Betracht gezogen werden, wenn in einem Falle von Darmverschluss die Ursache nicht klar ist. Die zur Stellung der Diagnose erforderliche Zeitspanne sollte zur Verbesserung des lokalen Zustandes des aufgeblaehten Darmes und zur Behandlung des Allgemeinzustandes des Kranken ausgenuetzt werden.

RIASSUNTO

Le ostruzioni intestinali da ernie interne sono rare. Il decorso fulminante ed i risultati disastrosi che conseguono ad un ritardo nella cura operativa richiedono che ogni chirurgo tenga presente la possibilita' di un'ernia interna di fronte ad una sindrome addominale acuta. L'A. descrive brevemente i diversi tipi di ernie interne, di cui presenta una classificazione. Illustra 3 casi del genere. Un primo caso riguarda un'ernia attraverso un difetto del grande omento, con un'insolita iperglicemia (che l'A. considera quale un tentativo fisiologico di difesa contro la rapida perdita di proteine e l'imminente pericolo di uno shock). Nel secondo caso esisteva invece un'ernia dell'ileo attraverso un difetto del mesentere ileo-cecale. Nel terzo un'ernia attraverso il forame di Winslow.

Di fronte ad ogni ostruzione intestinale a causa incerta signota, bisogna tenere quindi presente l'eventualita' di un'ernia interna; il tempo necessario per giungere ad una diagnosi va utilizzato onde migliorare le condizioni locali dell'intestino dilatato e le condizioni generali del paziente.

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Observations on Total Gastrectomy

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DESPITE the fact that total gastrectomy is formidable, it has become a relatively commonplace procedure Until a comparatively recent date those who attempted the operation found the mortality rate prohibitive The circumstances that have transformed this operation from a procedure with a prohibitive mortality into one which can be carried out with a low enough mortality to warrant its performance when indicated are the same that have enabled surgery in general to soar to its present heights of attainment Among the most important are improvements in anesthesia, as well as those in intravenous therapy in general and blood transfusion in particular (as regards both technic and availability of blood), the advent of the sulfa compounds and antibiotics, and the increased knowledge that has resulted in a more intelligent appreciation of the important role played by fluid and electrolyte balance in preoperative and postoperative states

Practically speaking, the only indication for total gastrectomy is involvement of the stomach by malignant disease to such an extent or in such a location that nothing short of complete removal of the organ can possibly result in satisfactory ablation of the lesion Although carcinoma is the usual culprit, sarcoma is not unknown, and on rare occasions the lesion, whether tumor or ulcer that necessitates total gastrectomy for its removal is benign I have had personal experience of 5 cases in which this operation was performed, and in each of these the lesion was a carcinoma

In considering the treatment of malignant disease of the stomach it must be borne in mind that, no matter what information has been gleaned from such diagnostic aids as roentgenographic and gastroscopic study, the decision as to whether total gastrectomy is the procedure of choice can be made only after the abdomen is opened and the growth examined Any surgeon therefore, who elects to operate upon a patient with malignant disease of the stomach must be prepared to proceed with a total gastrectomy It follows that an exploratory laparotomy for this condition should be undertaken only by a surgeon who as a result of his training and experience in gastric surgery has the necessary skill to perform this operation There is also the possibility that the disease has spread beyond the confines of the stomach and will necessitate such additional procedures as splenectomy and partial excision of other organs such as the pancreas the transverse colon and the left lobe of the liver These facts cannot be overemphasized If a surgeon who has not the requisite knowledge and skill attempts to deal with such a situation one of two equally disastrous courses will be pursued, either the tumor will be deemed inoperable the patient's only chance of cure being thus eliminated, or a partial gastrectomy will be attempted a procedure to be thoroughly condemned under these circumstances, as it leads at best to the same result and may even shorten the patient's life by increasing the rapidity of spread both of the local neoplasm and of its distant metastases As pertinent to these observations, the following personal case is cited At operation, although on palpation the pyloric portion of the stomach seemed obviously the seat of neoplastic infiltration it was not until this portion had been mobilized with the intention of performing a high partial gastrectomy that involvement of the body and fundus by the carcinoma (though nothing like so marked as in the pars pylorica) could be established satisfactorily Total gastrectomy was then performed, and microscopic examination of the specimen showed invasion by carcinoma cells up to the cardia This patient survived her operation by nearly four years A photograph of the specimen (Fig 1) is of considerable interest At the level of the incisura a wide, transverse depression formed as the result of healing of a large chronic ulcer Whether this ulcer was a predisposing or an exciting factor in the development of the carcinoma it is impossible to say, but my own interest in the specimen lies in the fact that it is the only one, either operative or postmortem, of a linitis plastica type of gastric carcinoma in which I have ever seen evidence of additional pathologic change, old or recent. This interest is further increased by the fact that several pathologists have reported a similar experience. This specimen may therefore be regarded as something of a pathologic curiosity.

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Preoperative Considerations. — Assuming that there is no clinical or roentgenologic evidence of distant metastasis—which would naturally contraindicate any operative procedure—the patient's preparation for surgical treatment must be considered. Efforts should be directed toward bringing him into the best possible condition. The first requisite is a thorough investigation of the patient's various systems, and this should be done by a competent internist. Only in this way can an accurate evaluation of his general condition be arrived at and any deficiencies or complicating factors, such as intercurrent disease, be given appropriate treatment before the operation.

Most patients with malignant lesions of the stomach suffer from some degree of inanition, evidenced by such manifestations as dehydration, hypoproteinemia and anemia, to say nothing of avitaminosis and perhaps other deficiencies which, in the present state of knowledge, may be described as "hidden" since they are not determinable. Hence the use of at least some, and perhaps all, of the present methods of supportive therapy may be necessary to achieve maximum preoperative improvement.

Operation.—Before passing on to a consideration of some of the more important technical aspects of the operation, it should be

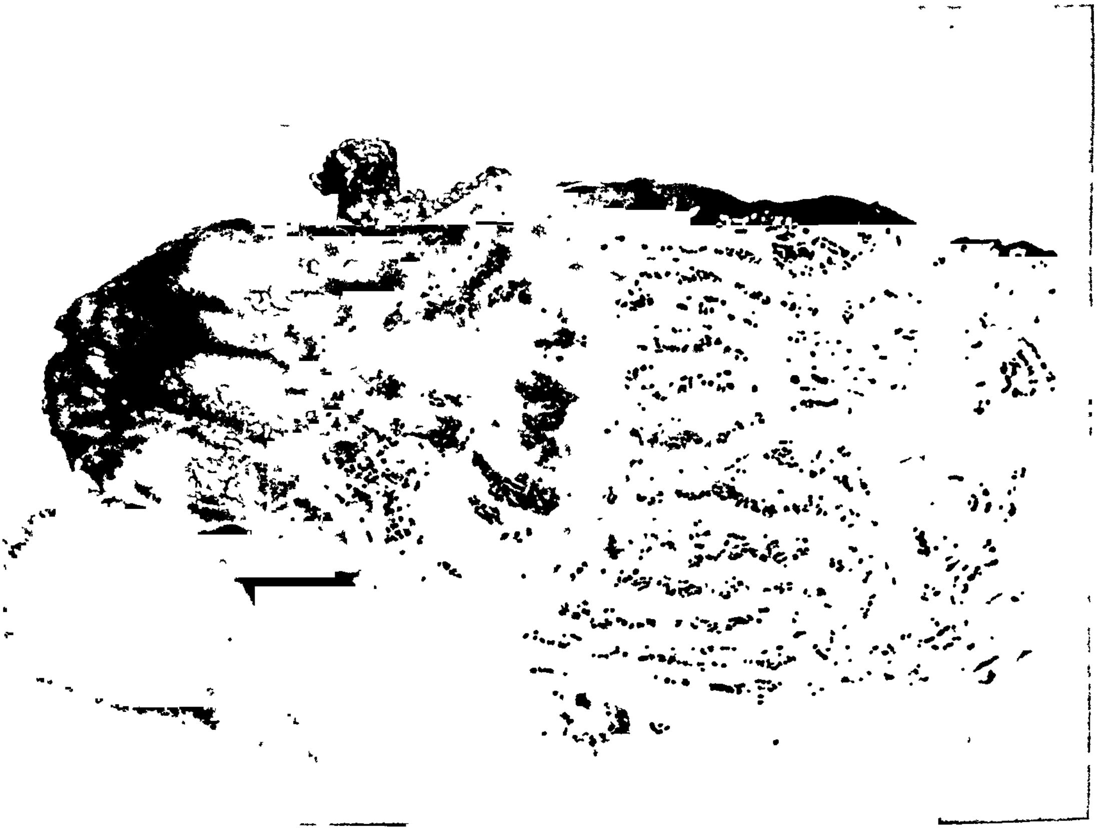

Fig. 1. Operative specimen. Carcinoma is of infiltrative type, involving whole of stomach. Note broad depressed scar of old healed ulcer.

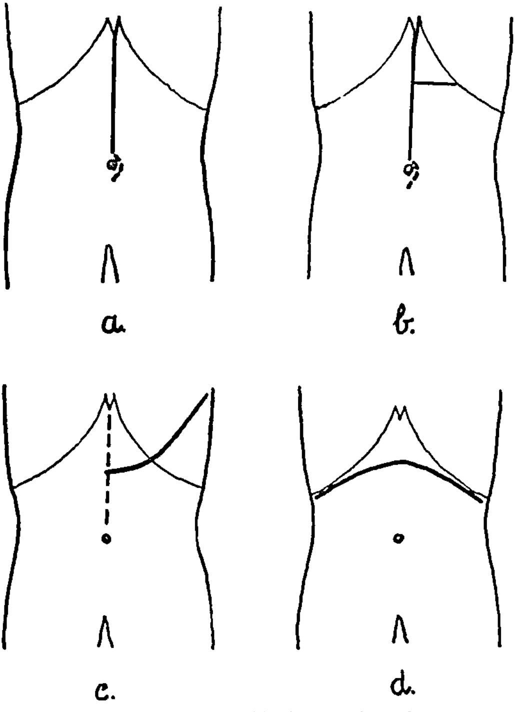

Fig 2 —Incisions which have been used by the author for total gastrectomy (a) midline supraumbilical, passing upward to left of xiphoid process (b) same, with transverse extension to left (c) thoracoabdominal (d) curved transverse epigastric

stressed that whenever clinical and other data have indicated the likelihood that nothing less than total removal of the stomach will have to be carried out there should be a plentiful supply of blood available for transfusion An operation of this magnitude should never be attempted when the availability of blood is in question and any hospital that is insufficiently equipped in this respect is certainly no place in which to attempt total gastrectomy Further it is emphatically desirable to begin the transfusion of blood as soon as the decision has been made in favor of total gastrectomy One should not wait to institute this measure until loss of blood has begun to show its effects by an increased pulse rate, falling blood pressure and general instability of the cardiovascular system. It is surely much sounder to anticipate such occurrences if possible, for, once they have occurred, restitution of the patient's condition may become gravely difficult in spite of correct and immediate treatment.

Determining the best possible exposure for total gastrectomy leads to a study of various incisions. In the attempt to evaluate several of these, I have used four types (Fig. 2), namely, a midline supraumbilical incision passing up to the left of the xyphoid process, the same with a transverse extension to the left as far as the costal margin, a thoracoabdominal incision and, finally, a curved transverse epigastric incision with its convexity upward. Although this operation can be performed through any one of these incisions, the better the exposure the more satisfactorily can each successive step be carried out and the less will be the trauma inflicted upon the tissues. The midline incision, with or without its extension to the left, suffers from the great drawback that the costal margin remains rigid and so tends to hamper manipulations in the confined space under the left dome of the diaphragm. (I have not tried additional removal of the xyphoid process, which is regarded by Lefevre[1] as the key to obtaining an "acces facile" to the subdiaphragmatic region.) Moving the incision to the left by making a paramedian incision is of little or no help and may actually increase whatever difficulties present themselves in dealing with the duodenal stump. The most obvious way to overcome the rigidity of the costal margin is to cut through it, and the best method of incorporating this procedure into an incision is to make one of the thoracoabdominal type. This incision, by opening up the eighth or the ninth intercostal space, allows wide separation of the costal margin, a separation which can be increased by incising the diaphragm toward the esophageal hiatus to whatever extent the surgeon finds expedient. In this way excellent access is gained to the space under the left dome. This incision can be looked upon as probably the most satisfactory so far as exposure of the cardia and the abdominal portion of the esophagus is concerned. In the case in which I used it the patient was a stout, thick-set man and it is doubtful if any other incision would have served as well. However, since a total gastrectomy is likely to last from four to five hours, such pulmonary complications as postoperative atelectasis or bronchopneumonia are definite risks entailed by this incision, in spite of the skill with which modern anesthetists utilize intratracheal intubation, intermittent expansion of the lung, etc. If this incision is used, the establishment of the operability of the lesion through the abdominal portion, before the thorax is opened, must be considered a *sine qua non*.

The curved transverse incision was also found satisfactory. Although this does not break the continuity of the costal margin, it frees this margin from its abdominal attachments to such an extent as to cause a material increase in its mobility, allowing it to be retracted anteriorly and upward sufficiently to provide a satisfactory exposure of the cardia. In my opinion, although this incision does not perhaps offer quite so good an exposure as does the thoracoabdominal incision, it is probably not so likely to lead to postoperative pulmonary complications. The choice between these two incisions in any particular case may be difficult. The higher the growth is situated in the stomach, the more I should be inclined to favor the thoracoabdominal approach. In this respect the roentgen data will provide important help.

Some years ago Professor Grey Turner concerned himself with attempts to remove esophageal carcinoma by his so-called "pull-through" operation. So far as I know he was one of the first, if not the first, to divide the left triangular ligament of the liver in order to mobilize the left lobe and so permit its retraction to the right as an aid in exposure of the abdominal portion of the esophagus. On two occasions I found that the division of this ligament was not necessary, but it is certainly a maneuver worth keeping in mind, and in most total gastrectomies it proves to be of great assistance.

From the number of times one reads of splenectomy performed simultaneously with total gastrectomy, one gains the impression that removal of the spleen has become almost a routine with some surgeons. I removed the spleen in only 1 of my cases; some degree of

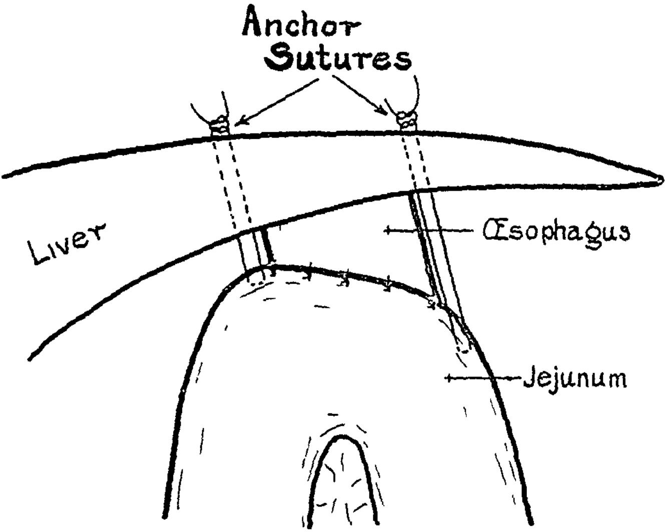

Fig 3 —Diagram showing method of support for œsophagojejunal anastomosis

perisplenitis was present, resulting in adhesions between the stomach and spleen so that attempts to separate these two organs as the first step towards eventual ligation of the vasa brevia, resulted in tearing of the splenic capsule and pulp, with consequent hemorrhage necessitating splenectomy for its control If the spleen has become involved in the spread of malignant disease its removal naturally is imperative, but if such involvement has not taken place I am of the opinion that its removal is unnecessary unless its presence creates technical difficulties which can not otherwise be overcome, or when hemorrhage from the vasa brevia, often difficult to control since it occurs in the depth of the wound, is in the opinion of the surgeon troublesome enough to warrant its control by ligature of the splenic artery This is customarily accomplished not by ligature in continuity but by the easier method of legating the whole of the splenic vascular pedicle and following this of course with splenectomy

However satisfactorily total removal of the stomach may have been carried out, one must remember that the operation will be a failure unless the anastomosis between the esophagus and the small bowel is satisfactory The criterion is absence of leakage from the anastomosis, if such leakage occurs there is little chance of saving the patient's life The prevention of leakage is therefore of paramount importance, and its achievement depends upon measures, to be discussed presently, which will combat successfully the factors responsible for leakage A knowledge of these factors is essential In brief, they are (1) failure to make a water tight anastomosis (2) inter ference with the blood supply to the lower end of the esophagus to such an extent as to cause necrosis and (*3*) tearing out of the sutures with consequent disruption of the anastomosis. In considering these causes one must not forget that an anastomosis which is water-tight when completed, and thus far is a success, will still be a failure if such success has been achieved by use of a technic that results in either the second or third cause of leakage.

From the technical standpoint the aim of the surgeon in performing any anastomosis is to insure that it will be water-tight when completed. No anastomosis can be successful unless it fulfils this basic requirement. This usually implies that circumstances have permitted accurate insertion of the sutures, and in the average anastomosis this is the case. In the anastomosis under discussion, however, there are at least two factors that may have an adverse effect on the suture technic. First, the esophagus is not composed of such strong tissue material as is the bowel and therefore tears more readily; second, exposure of the site of anastomosis is sometimes not all that could be desired. There is nothing one can do to improve the first condition, but knowledge of it should lead to the observance of great gentleness in handling, as otherwise irreparable damage may be done. With regard to the second, the better the exposure of the operative site the greater will be the ease and consequent accuracy with which suturing can be performed. This point has already been given consideration.

Insertion of the posterior rows of sutures is the most difficult part of the anastomosis. In my experience, retention of the stomach at this stage has the advantage of enabling this viscus to be used as a tractor to pull the esophagus gently downward and keep it fixed and steady, thus helping materially to insure the satisfactory insertion of these sutures. Most surgeons appear to agree that this retention of the stomach until completion of the posterior rows of sutures is preferable to its earlier removal and the use of a clamp on the cut end of the esophagus, as was once the customary procedure When discussing suturing it is perhaps not out of place to mention that it is an easy matter to pleat the end of the esophagus inadvertently when inserting either the outer rows of Lembert sutures or the through-and-through continuous one, and it is probable that this is the most likely cause of the strictures one sees reported from time to time. To have an otherwise satisfactory result marred by such an occurrence is both unfortunate for the patient and embarrassing to the surgeon, especially when it can almost certainly be avoided by the use of lateral stay sutures; with a little tension on these sutures parallel to the line of anastomosis the full width of both posterior and anterior halves of the circumference of the esophagus can be maintained while suturing is in progress.

It is important to realize that the lower end of the esophagus is, at best, relatively poorly supplied with blood. This was well demonstrated many years ago by Demel's investigations on the human esophagus.[2] The blood supply to this portion of the gullet is derived from the following three sources: descending branches of the arteriores esophageae propriae which arise from the aorta or intercostal vessels and enter the esophageal wall above the diaphragm to run downward in the muscularis on their way to ramify in the submucosa; some twigs from the left inferior phrenic artery which descend in a similar manner, and ascending branches from the left gastric artery. The last-mentioned source is the largest; by the time the anastomosis is undertaken, this part of the esophagus has already been deprived of more than one-third of its normal blood supply because of ligation of the left gastric artery. Conservation of the remaining blood supply, consisting only of the descending branches just mentioned, thus becomes a matter of prime importance; comparatively little further damage may suffice to produce one or more areas of necrosis adjacent to the cut edge of the esophagus and thus permit leakage from the anastomosis, an occurrence invariably fatal.

What can be done in the interests of this conservation? In the first place, I consider it important to refrain from separating the esophagus from its diaphragmatic attachments at the hiatus, as is sometimes done in order to allow the esophagus to be drawn further downward into the abdominal cavity. This maneuver deprives the lower end of the esophagus of the blood it ordinarily receives from the left inferior phrenic artery by severing the branches from this source It also involves the added disadvantage of opening up the connective tissues of the mediastinum, a result which although admittedly not fraught nowadays with the serious danger that used to attend it in the presulfonamide and preantibiotic era, nevertheless stamps this procedure as both undesirable and unnecessary Second it must be remembered that the outer rows of Lembert sutures can be inserted in such a way as to interfere seriously with the blood supply This can usually be averted by taking care that these sutures are interrupted and that vertical bites of esophageal wall are taken, so that the sutures lie parallel to the descending blood vessels otherwise any of these underrun by a transverse bit would be occluded immediately on the tying of the suture

Tearing out of the sutures which consequent disruption of the anastomosis can result from one of two causes, either tension or drag due to the weight of the jejunum So far as the former is concerned, there is so much jejunum available that it seems ridiculous to find the question of tension arising at all Yet it can easily do so if, when one is determining the length of the loop of the jejunum between the duodenojejunal flexure and the cut end of the esophagus, due allowance is not made for the shortening effect of suturing Hence one should always remember to err on the generous side in deciding the length of that portion of the jejunum which will form the afferent loop The fear that the weight of the jejunum may produce sufficient drag on the anastomosis to cause tearing out of the sutures had led surgeons to consider it advisable to furnish the anastomosis with some form of support Attachment of the jejunum to the diaphragm has been perhaps most often suggested but I have always been impressed by the considerable distance between the diaphragm and the completed anastomosis a circumstance which led me to adopt a different form of support This is shown diagrammatically in Figure 3 It consists of placing a Lembert suture of plain No 0 catgut through the jejunum just lateral to the anastomosis on each side threading each end in turn through the substance of the left lobe of the liver and then tying them on its superior surface, tightly enough to draw the jejunum into contact with the inferior surface Anchoring the jejunum to the liver provides the anastomosis with a support possessing the dual merits of simplicity and efficiency

Cases have been reported from time to time in which the continuity of the alimentary tract after total gastrectomy was restored successfully by an end to-end anastomosis between the esophagus and duodenum Although esophagoduodenostomy effects a more physiologic restoration of continuity than esophagojejunostomy the main factor that militates against its frequent performance is the difficulty of insuring the absence of tension between the cut ends When this difficulty can be overcome esophagoduodenostomy is a rational procedure and surgeons regard it with enthusiasm It seems probable however that its applicability will remain limited to a minority of cases the anatomy [illegible] in the majority of patients is such that [illegible] mobilization of the duodenum although carried out to the fullest possible extent does not permit its cut end to be brought into apposition with that of the esophagus without tension Such at least has been my experience

An important question that always arises after completion of the esophagojejunostomy is whether to perform an interanastomosis between the afferent and efferent loops of the jejunum I still feel there is much to be said for a remark I made in a previous communication[3] Its omission has not prevented a successful outcome in many a case nor on the other hand has its performance by any means always prevented a fatal outcome so that it cannot be regarded as absolutely essential However many surgeons (among whom I must include myself) appear to consider it a worthwhile procedure and prefer not to omit it There are two reasons to justify this decision First it allays whatever fears one may have that its absence will result in distention of the long proximal loop in the early postoperative period causing rupture of the recently inverted duodenal stump Second, decompression of this loop by such an anastomosis prevents stagnation of food and bile within it and thus adds much to the patient s comfort Consequently it has always been my practice to perform this anastomosis after completion of the esophagojejunostomy, placing it on the afferent loop just distal to the duodenojejunal flexure, below the opening in the transverse colon through which the jejunal loops pass.

I was much interested to learn recently from Lahey,[4] who once favored the omission of esophagojejunostomy, that he had decided some years ago to adopt the procedure because of the development of esophagitis in cases in which it had been omitted.

Postoperative Conditions.—Since satisfactory healing of the esophagojejunostomy is of such great importance and the surest way of promoting it is by rest, food by mouth should be withheld for the first few days. This means that efforts must be directed toward the maintenance of physiochemical values within normal limits until the patient can tolerate a normal diet. Although as a rule these efforts consist solely of intravenous therapy, I should like to draw attention to a somewhat neglected procedure—tubal alimentation—as a worth-while aid to the successful postoperative maintenance of normal physiochemical values. Just prior to the completion of the esophagojejunostomy a Levine tube is passed down the esophagus and guided through the anastomosis into the efferent loop of the jejunum for a few inches. A tube so placed has two important advantages: Not only can it be used for feeding, but should any indication for suction arise this can be applied without further trouble or delay. Through this tube predigested food can be introduced directly into the intestinal tract, the important feature of this food being that it contains all the dietary elements (in marked contrast to intravenous solutions, which are lacking in most of them). It is an easy matter to have this predigested food compounded of a balanced formula, 1 cc. representing 1 calorie; thus, 1,000 cc. will furnish 1,000 calories as opposed to the 400 calories present in a similar quantity of 10 per cent dextrose solution or the 200 to 300 calories supplied by a liter of protein derivative solution. However, one must realize that this type of tubal alimentation has quantitive limitations and cannot be regarded as comparable to feeding through a gastrostomy tube, with which 4 or 5 ounces of formula may be introduced in a few minutes without any distress to the patient. Should a rapid rate of drip be started, after some 20 or 30 cc. has been introduced the patient will usually complain of pain in the upper part of the abdomen, apparently due to sudden distention of the jejunum, and another hour or so may pass before any more formula can be given. Hence it is preferable to use a continuous but slow rate of drip aimed at introducing 1 to 1.5 liters in twenty-four hours, as this is approximately the maximum amount that can be introduced without upsetting the patient. Whatever additional water is considered necessary may be supplied intravenously or, since the introduction of alidase, may be given painlessly by hypodermatoclysis if the former route should present undue difficulties, as on occasion it may. If all goes well the tube should be removed about the fifth day, after which the patient is given clear fluids by mouth, frequently and in small quantities e.g., 1 ounce every fifteen to thirty minutes. Once this postoperative stage has been reached it is gratifying to observe how quickly the diet may be increased with no discomfort to the patient.

Other postoperative measures to increase the patient's resistance to infection, such as the administration of antibiotics and vitamins, have become more or less routine practice.

A striking feature noted by many authors is that patients who recover from the operation usually enjoy an extraordinarily smooth convalescence considering the severity of the procedure. Should the abdomen become the seat of trouble, experience indicates that the esophagojejunostomy has not been satisfactory and that leakage has occurred, with its resulting peritonitis and gloomy prognosis.

SUMMARY

Certain observations are made on some of the more important and, in some instances, controversial features encountered in the preoperative, operative and postoperative aspects of total gastrectomy in the hope that they may prove of practical value, especially to those who have not yet essayed this rigorous surgical exercise.

RÉSUMÉ

L'auteur rapporte son expérience personnelle avec les différents aspects préoperatoires,

operatoires, et postopératoires de la gastrectomie totale

La laparotomie exploratrice pour les maladies malignes de l'estomac ne doit être entreprise que par un opérateur de grande expérience en chirurgie gastrique car la gastrectomie totale qui peut être le traitement de choix dans certains cas est une opération d'une magnitude beaucoup plus grande que l'ablation partielle de l'estomac

L'auteur recommande la transfusion sanguine immédiatement apres avoir décidé de soumettre le malade à une gastrectomie totale au lieu d'attendre que l'hémorragie ait determine une influence nocive sur le système cardiovasculaire

L'auteur discute les differents stades operatoires division du ligament triangulaire du foie, esophagojéjunostomie, duodénejéjunostomie et jéjunojejunostomie)

Les causes de fuite après une esophagojejunostomie et les mesures pour combattre cet accident sont considérées

La splenectomie est discutée en rapport avec la gastrectomie totale

L'emploi d'alimentation tubaire est recommandé pour le traitement postoperatoire

ZUSAMMENFASSUNG

Der Verfasser berichtet seine auf eigener Erfahrung mit totaler Magenresektion beruhenden Beobachtungen und geht hier und da auf die strittigen Fragen ein, die sich in praeoperativer, operativer und postoperativer Hinsicht ergeben

Er betont, dass Probelaparatomien wegen boesartiger Magenerkrankungen nur von erfahrenen Magenchirurgen vorgenommen werden sollten, da die totale Magenexstirpation die sich in jedem einzelnen Falle als die Behandlung der Wahl herausstellen mag, ein Eingriff von viel groesserem Umfang als eine Teilresektion des Magens ist

Der Verfasser hebt hervor, dass es ratsam ist, mit Bluttransfusionen unverzueglich nach der Entscheidung fuer eine totale Magenresektion zu beginnen, anstatt zu warten, bis eine Blutung das Kreislaufsystem unguenstig beeinflusst haben mag

Unter den technischen Punkten, die der Verfasser bespricht, finden sich Fragen des Einschnitts, die Trennung des linken dreieckigen Leberligaments, die Oesophagojejunostomose, die Duodenojejunostomose und die Jejunojejunostomose

Die Ursachen fuer Undichtigkeiten in Oesophagojejunostomosen und die Mittel sie zu bekaempfen, werden beruecksichtigt

Die Milzresektion in Beziehung zur totalen Magenexstirpation wird eroertert Die Schlauchernaehrung findet als wertvolles Verfahren in der postoperativen Behandlung besondere Erwaehnung

RIASSUNTO

Traendo argomento dai risultati della propria esperienza nel campo delle gastrectomie totali, l'A espone e discute alcuni punti controversi riguardo le cure preoperative operative e postoperative Richiama l'attenzione sopra la necessita' che le laparatomie esplorative per tumori maligni dello stomaco vengono intraprese solo da chirurghi veramente esperti di chirurgia gastrica dato che la gastrectomia totale—che puo diventare in taluni casi l'operazione di elezione—e un'operazione molto piu' estesa e complicata della gastrectomia parziale

L'A ritiene inoltre che le trasfusioni di sangue debbano essere iniziate subito dopo la decisione di una gastrectomia totale le emorragie influirebbero infatti dannosamente sopra il sistema cardio vascolare annullando quindi i vantaggi delle trasfusioni

Nella discussione sopra la tecnica operatoria, l'A include il tipo di incisione la divisione del legamento triangolare del fegato l'esofago—digiunostomia, la duodeno—digiunostomia, la digiuno—digiunostomia

Vengono discusse le cause di una non perfetta riuscita dell'esofago—digiunostomia e le misure atte a migliorare i risultati dell'anastomosi L'opportunita' di una splenectomia viene pure vagliata

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A Nonrigid Method of Treatment for Early Clubfoot

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ADHESIVE traction employing gum mastic, ether and flannel bandages demonstrated its effectiveness in the treatment of early clubfoot more than twenty-five years ago. Nevertheless this method failed to gain general favor, because of its messiness. The majority of orthopedists still treat early talipes with repeated plaster casts.

The following nonrigid, semi-elastic procedure, which I have employed with excellent results in more than 100 cases, retains the advantages of gum-mastic adhesive traction without its drawbacks. In the absence of muscular or bony deficiency, even the worst clubfoot can be brought into extreme overcorrection in three to six weeks and the overcorrection easily maintained thereafter.

TECHNIC

Moleskin adhesive, flannel bandages and ordinary adhesive tape are the only materials required. At the first strapping three strips of moleskin are applied, 1 inch (2.5 cm.) wide and varying in length from nine to twelve inches (22.5 to 30 cm.). The first strap starts on the dorsum of the foot at the base of the fifth toe, is carried over the foot to the middle of the first toe and brought underneath to the fifth toe. The foot is then forced into a slightly corrected position, after which the moleskin is carried up the outer aspect of the leg, passed over the flexed knee to the inner or posterior aspect, and brought down to the midcalf (Fig. 1*A*). This strap easily maintains the slightly corrected position of the foot.

The second strap starts just above the inner malleolus and passes down around the heel, which is forced into slight correction; then it also is carried up the outer aspect of the leg, over the knee to the inner aspect, and down to the midcalf (Fig. 1*B*).

The third strap starts on the dorsum of the foot, between the other two, at the metatarsotarsal joint, crosses the dorsum to the inner side, goes underneath the foot to the base of the fifth metatarsal and is spiraled around the calf of the leg up to the knee (Fig. 1*C*). The strapping is then covered with a flannel bandage, held in place with adhesive tape.

After strapping, the patient is kept under observation for half an hour to an hour to make sure that there is no interference with circulation. Should the toes turn blue or white, the dressing must be loosened. The parents are instructed to keep a strict watch on the toes for blanching or cyanosis and to report any signs of either immediately. However, it is advisable for the orthopedist to make a personal check on the following day. The feet are kept in elevation.

Two days after the original strapping, three strips of ordinary adhesive tape are applied over the flannel bandage in the same manner as the moleskin, increasing the correction. Another correction is made two days later.

The following week and every week thereafter until the desired degree of overcorrection is attained, the complete dressing is removed and the entire procedure repeated. Usually three to six weeks suffice to bring the foot into extreme calcaneovalgus, with the equinovarus greatly overcorrected and the dorsum of the foot lying on the outer aspect of the leg.

About 10 per cent of patients are susceptible to irritation of the skin during this phase of treatment. Should it occur, the use of moleskin must be discontinued and only flannel bandages used until healing takes place.

Once the foot is in calcaneovalgus, a circular strap across the forefoot and the calf of the leg is sufficient to maintain the overcorrection (Fig. 1*D*). This type of strapping is repeated first weekly, then biweekly, then every three weeks and finally once a month.

By the fourth and fifth month the patient may be permitted to go without strapping for several days at a time. The bandage-free interval is gradually increased: by the seventh month, as a rule, strapping is applied only once every six weeks and kept on for only a week or ten days at a time.

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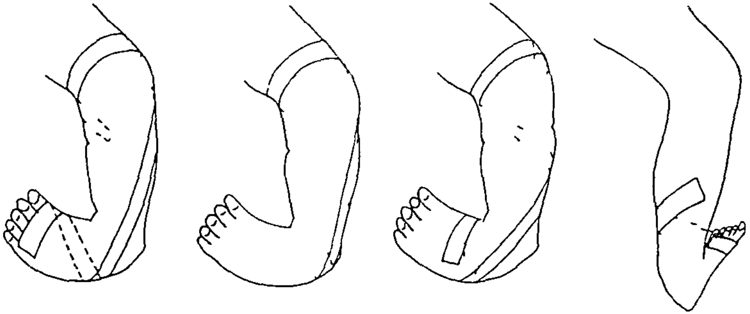

Fig 1—Application of straps *A* first strap started on dorsum at base of fifth toe is carried over foot to middle of first toe and brought underneath to fifth toe After slight correction of position of foot strap is carried up outer aspect of leg above flexed knee to inner or posterior aspect and down to midcalf *B* second strap, started just above inner malleolus is carried down around heel and after slight correction of latter is continued up outer aspect of leg etc like first strap *C* third strap started on dorsum at metatarsotarsal joint, is carried across dorsum to inner side goes underneath foot to fifth metatarsal and is spiraled around calf up to knee *D* circular strap across forefoot and calf of leg to maintain overcorrection once foot is in calcaneovalgus

Once the child is able to walk strapping is entirely discontinued and replaced with corrective shoes However frequent observation is advisable over a period of several years to guard against a return of the deformity Occasionally the forefoot may go into slight varus This is correctible by a special night brace All in all, at least three years must elapse before the condition can be considered permanently cured (Figs 2 3 4 and 5)

COMMENT

The method of nonrigid, semi elastic traction here described has many advantages over the use of plaster casts A full strapping takes only a quarter of the time required for the application of plaster and causes less discomfort to the patient It is more easily removed

Whereas plaster casts are usually changed once a week at most, more usually every ten days or two weeks with adhesive traction the

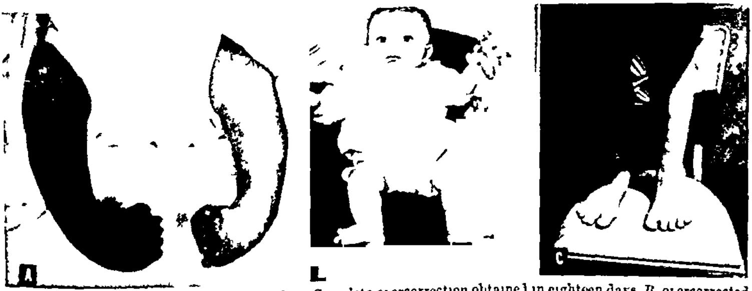

Fig 2—*A* bilateral clubfoot in 2 day old boy Complete overcorrection obtained in eighteen days *B*, overcorrected foot four and a half months after start of treatment *C* condition at age of 8½ years no evidence of clubfoot

degree of correction can be increased every two or three days. Thus overcorrection is accomplished in three to six weeks, as compared to approximately three months with plaster.

Except for occasional cutaneous irritation, the moleskin strapping produces no adverse effects. In contrast, the use of plaster casts frequently results in severe atrophy. Often

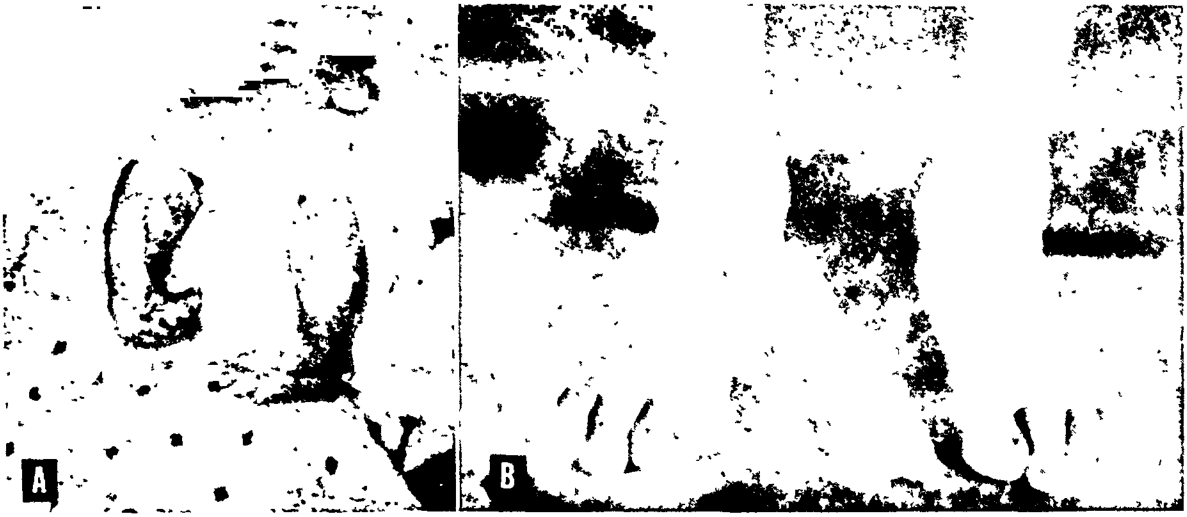

Fig. 3.—*A*, bilateral clubfoot in boy aged 6 weeks on whom unsuccessful attempts at correction had been made elsewhere with plaster casts. Treatment by method described brought feet into extreme valgus in ten days. Slight varus of forefoot, observed two years later, corrected by manipulation. *B*, same boy, at age of 16 years, with marked pronation of feet; treated with arch supports and corrective exercises. No evidence of clubfoot.

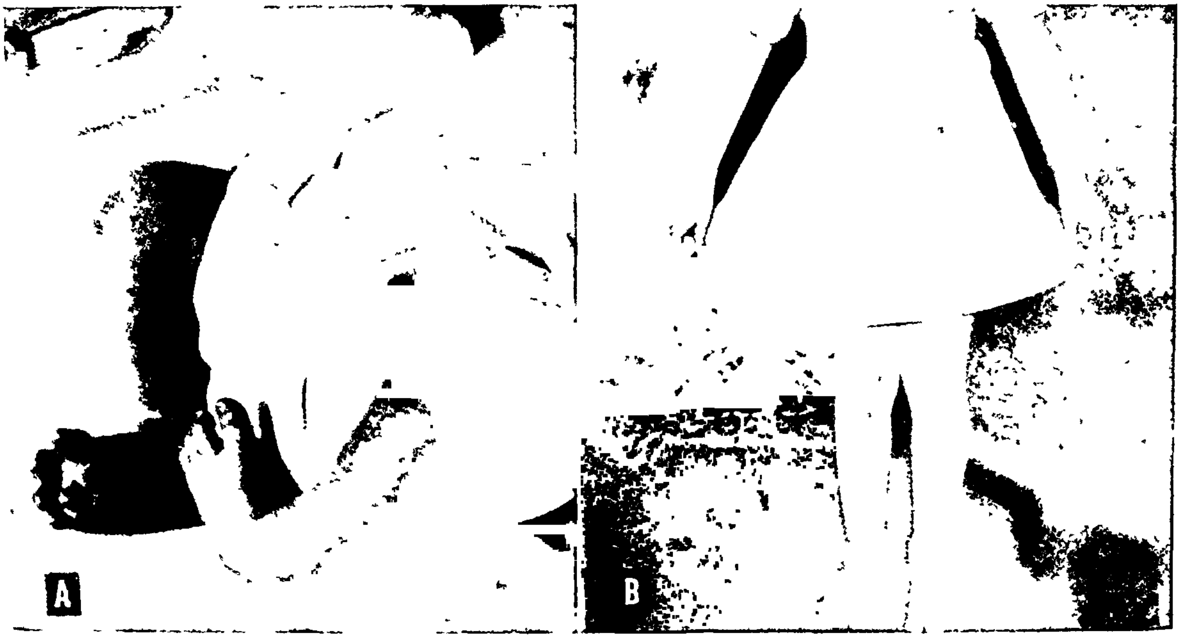

Fig. 4.—*A*, left clubfoot and varus of right great toe in girl 1 day old. Within three and a half weeks the left foot was in extreme calcaneovalgus. Repeated strappings applied for two and a half months, when family left city and child no longer came for treatment. One year later, return of equinovarus and shortening of tendo achillis observed; heel in varus. Equinovarus corrected by resumption of strapping. In view of tendency to recurrence, wedged casts applied over adhesive tape to maintain position. Varus of heel completely corrected within two and a half years; tendency toward varus of forefoot overcome by means of special brace. *B*, child at age of 6, with no evidence of clubfoot or varus of forefoot.

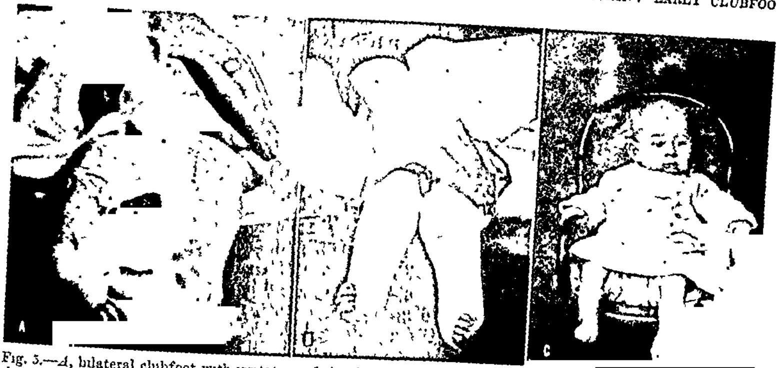

Fig. 5.—*A*, bilateral clubfoot with irritation of the skin in a boy aged 2 weeks. Repair deferred till healing of skin. *B*, one month after beginning of treatment, feet in extreme overcorrection. *C*, three months after beginning of treatment. Until his death from pneumonia at age of 2 years, child walked normally without any sign of deformity

the heel turns into varus within the cast

The cohesive gauze bandages sometimes used instead of plaster have many of the latter's disadvantages. They do not stick to the legs and the heel can turn within the bandage as it does within a cast. However these bandages can be used instead of flannel in the technic of adhesive traction

SUMMARY

The author describes his method of treating early clubfoot by nonrigid, semielastic traction, with which he has been able to bring even severe deformity into extreme overcorrection in three to six weeks, provided there is no muscular or bony deficiency The overcorrection is easily maintained thereafter

The advantages of this method over the use of plaster casts are stressed

ZUSAMMENFASSUNG

Der Verfasser beschreibt seine Behandlungsmethode des fruehzeitigen Klumpfusses durch nichtstarren, halbelastischen Zug, womit er in der Lage ist, selbst Faelle von schwerer Deformierung innerhalb von drei bis sechs Wochen in aeusserste Ueberkorrektionsstellung zu bringen, vorrausgesetzt, dass kein Muskel—oder Knochendefekt vorliegt Die Ueberkorrektion laesst sich dann leicht aufrechterhalten Es werden die Vorteile dieser Methode gegenueber der Anwendung von Gipsverbaenden hervorgehoben

SOMMAIRE

L'auteur décrit sa méthode de traitement du pied bot peu avancé par une traction non rigide semi-élastique; avec cette méthode, il a converti des cas très sévères de difformité en surcorrection extrême Le traitement dura de trois à six semaines, pourvu qu'il n'y eût aucune déficience musculaire ou osseuse. La correction exagerée est facilement maintenue après ce laps de temps.

Les avantages de cette méthode sur l'emploi des attelles en plâtre sont très évidents

RIASSUNTO

L'A descrive il proprio metodo di cura per il piede equino, varo, valgo. Mediante una trazione non rigida, semielastica, questo metodo consente in un periodo da 3 a 6 settimane un'ipercorrezione anche delle deformita' piu' gravi qualora non esistano deficienze ossee o muscolari. L'ipercorrezione viene poi mantenuta facilmente. Vengono infine discussi i vantaggi della trazione sopra l'ingessatura.

Gallstone Ileus

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GALLSTONE ileus is a relatively uncommon but decidedly important condition causing intestinal obstruction. Prior to 1928, only 78 cases were reported in the roentgenologic literature, and among these the diagnosis was made preoperatively only in the exceptional case. In recent years, with improved roentgen technic and a more attentive cognizance of the condition, the diagnosis is being made in many more cases. Given an elderly woman with long-standing biliary disease in whom intestinal obstruction develops either suddenly or gradually, the clinican may suspect the possibility of gallstone ileus, and the roentgenologist may prove it. Even in cases in which the symptoms do not fall into a definite pattern a correct diagnosis may be made by the roentgenologist.

The unusual occurrence of this condition in a comparatively young male patient with vague symptoms justifies adding another case to the rapidly growing literature. The importance of early diagnosis for a favorable prognosis, as well as the high mortality rate—varying from 50 to 90 per cent—associated with delay in diagnosis, necessitates constant awareness of the possibility of this disorder.

Gallstone ileus is primarily a disease of elderly women. In a series of cases reported by Hinchey[1] and another reported by Balch,[2] the average age was 66 and the youngest patient about 30 years of age. Women outnumbered men in the ratio of about 15 to 1.

Pathogenesis.—The pathogenesis is not clearly established. In the majority of cases a cholecystoenteric fistula exists. Occasionally, stone ileus may be due to the passage of a stone through the common duct. However, it is a matter of conjecture whether a normally passing stone can produce obstruction. The predisposing factor is usually an attack of acute cholecystitis and pericholecystitis with adhesion formation between the gallbladder and an adjacent viscus. Obstruction of the common duct by a stone with a patent cystic duct initiates the formation of a fistula. Acute or chronic inflammation of the gallbladder sets in; adhesions form, and fistulization follows. Recurrent attacks of intestinal colic with partial impaction of the stone may then take place. Fistulas occur most often between the gallbladder and the duodenum. Somewhat less frequently they form between the gallbladder and the colon, and still less commonly they occur between the gallbladder and the stomach or between the common duct and the intestine. In the formation of cholecystocolic fistulas, neoplasm takes precedence as a causative factor; in that of choledochoduodenal fistulas, ulcers play the primary role. There have been occasional reports of emptying of the stones into the bronchial tree, the precardial sac, the pelvis of the kidney and the uterus, respectively.

With the passage of the stone the fistula may close off completely, so that at a later date only dense adhesions are observed. In many patients examined at autopsy no fistulous tract has been observed. The stone may lodge in the intestine for months, even for years, before obstruction develops. When obstruction occurs it is usually in the ileum, where the small intestine is relatively narrow. Many factors besides the size of the stone influence the occurrence of obstruction. The type and number of facets or edges of the stone, kinks in the bowel, the rate of peristalsis or ulceration in the bowel wall may precipitate obstruction. Passage of a stone with facets should suggest the possibility that other stones have been left in the intestine. A stone may be the cause of a volvulus or intussusception. The largest stone removed was described by Turner.[3] It weighed 155 Gm. and measured 7 by 6 by 17 Cm.

Symptoms.—There may be no symptoms prior to acute intestinal obstruction, or, on the other hand, the history may be suggestive. At

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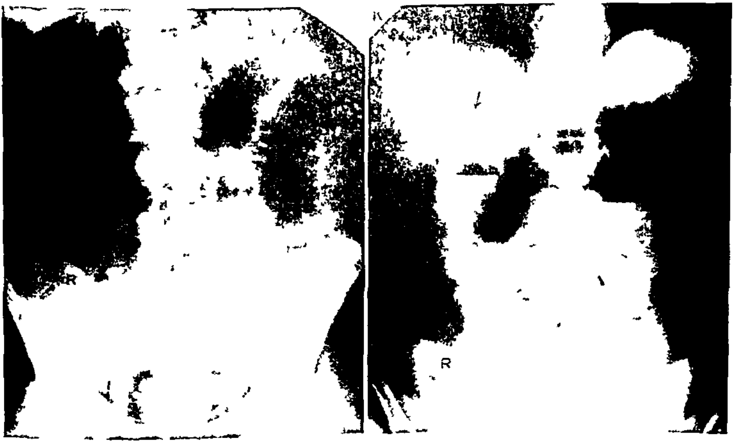
any one time the symptoms may be referable to disease of the gallbladder, to migration of the stone into the intestine or to intestinal obstruction itself In approximately 50 per cent of reported cases a history of longstanding chronic disease of the gallbladder or of recurrent attacks of acute cholecystitis is recorded When the stone passes into the intestine, severe pain with or without vomiting may be present in the upper part of the abdomen During passage of the stone through the tract, temporary ileus with nausea and vomiting may occur These bouts may recur repeatedly for years until final obstruction takes place With the formation of a spontaneous *internal biliary fistula the attacks* of intermittent gallbladder pain and jaundice may cease Despite the presence of a fistula, clinical cholangitis is infrequent Should the fistula involve the colon diarrhea cramps, emaciation, fever and chills occur commonly Symptoms of intestinal obstruction in varying degrees are present in 50 per cent of the cases, some form of chronic cholecystitis is present in the majority When an elderly *woman presents herself with a story of long* standing disease of the gallbladder and a bizarre type of intestinal obstruction, *the diagnosis may be suspected*

Physical Signs—Physical examination gives inconclusive results in the majority of cases Distention is only moderate, and tenderness is late A mass is rarely felt If the fistula occurs high in the intestine vomiting may be a leading symptom Evidence of dehydration with obstruction of the upper part of the bowel may be present The formation of a fistula may simulate a typical attack of disease of the gallbladder with pain and tenderness However obstruction is usually intermittent and few physical observations are noteworthy until it becomes complete Since many stones pass spontaneously through the rectum obstruction may never be complete

Diagnosis—Clinically the diagnosis of gallstone ileus is not tenable without roentgen confirmation Preoperatively the diagnosis may be suspected *if gallstone disease is of long* standing and a bizarre *type of obstruction is* present To impart authority to mere suspicion certain roentgen features are of importance



Illustrative roentgenograms

The following roentgen signs point to the diagnosis:

1. Air or a contrast medium in the biliary tract
2. (*a*) Direct visualization of the stone or (*b*) Indirect visualization of the stone by means of a contrast medium in the intestine (stones are not visualized often in the intestine, since their chemical composition is chiefly cholesterol; about 80 per cent are not radiopaque)
3. Change in position of a stone previously observed
4. Roentgen appearance of partial or complete intestinal obstruction.

Obstruction of a functional gallbladder negates the diagnosis of fistula and ileus due to stones. Therefore, if time permits, the corroborative feature of a nonfunctioning gallbladder is important. If a cholecystocolonic fistula is suspected, a barium enema study may demonstrate reflux in the biliary tree.

Treatment.—Treatment of this condition requires nicety of judgment and taxes the versatility of the surgeon. The recent addition of suction drainage may complicate rather than simplify the problem. Valuable time may be lost by repeated and prolonged attempts at decompression of the small bowel. If operation is delayed too long, perforation of the intestine proximal to the stone may occur. The operation should be done when the progress of the stone is stopped and more or less complete obstruction of the bowel exists. If circulatory changes are suspected or if abdominal tenderness with leukocytosis, fever or increased pulse rate is present, surgical treatment is indicated.

The treatment of choice is simple enterotomy with removal of the stone. If facets are present on the stone, a search for sister stones must be conducted. If obstruction is marked, a Miller-Abbott tube will help in preoperative decompression of the small intestine. Operation on the gallbladder is not indicated at the time of removal of the stone. Even after the patient has recovered from gallstone ileus, operation on the fistulous tract is difficult and ill advised. Many fistulas close spontaneously. Should cholangitis follow or altered hepatic function appear, a fistulectomy may have to be done. McQueeney[4] cited 2 instances of cholecystoduodenal biliary fistulas, of fifteen and nineteen years' duration respectively, without evidence of cholangitis. The majority of patients are old and infirm, and closure is hazardous. With a cholecystocolonic fistula, cholangitis is more likely to develop; in such circumstances closure may be desirable if the patient's condition permits.

The following case presents certain features of clinical, roentgenologic and therapeutic importance.

REPORT OF CASE

J.G., a 53-year-old white man, was first seen on June 12, 1949, with a history of intermittent hypogastric and periumbilical cramplike pains of three weeks' duration. These had become progressively more severe during the past few days, during which he had bouts of vomiting occurring one to three hours after meals. The emesis contained gross foods or bile. For four days the patient had had no bowel movement even after an enema. There was no antecedent history of cholecystic disease, colic or jaundice. No altered qualitative or quantitative food intolerance was demonstrable.

Of the common childhood illnesses, the patient had had scarlet fever only. In 1936 he had hematuria. On cystoscopic examination a small papillomatous growth was noticed. Since biopsy suggested that the tumor was benign, it was treated by fulguration. In 1938 a recurrence of the symptoms necessitated cystoscopic study, and a tumor on the floor of the bladder was noted. A biopsy at this time revealed a papillary carcinoma, which was treated again by fulguration. The patient was well for ten years. In January 1948 a reactivation of his symptoms necessitated further cystoscopic procedures. A papilloma on the anterior wall of the bladder, behind the vesical neck, was revealed. This was treated by resection of a portion of the bladder. The postoperative course was uneventful. Three weeks after discharge the temperature became elevated, and a sharp, colicky pain was felt in the right upper quadrant of the abdomen. A roentgenogram of the chest suggested a pneumonic patch. Treatment with antibiotics effected complete recovery within one week. After his discharge from the hospital the patient went on a vacation, during which there occurred an occasional mild bout of pain in the right upper quadrant, vomiting and fever without jaundice. Three weeks prior to admission to the Post Graduate Hospital the present complaints developed.

Physical examination on admission revealed the patient to be in acute distress. His abdomen was slightly distended, and he showed evidence of moderate dehydration Except for an abdominal scar low in the midline and the aforementioned slight distention, abdominal examination revealed no abnormality Peristalsis was prompt and hyperactive No tenderness or rebound was elicited, and no masses were felt On admission the temperature was 100 F, the pulse rate 90 and the blood pressure in millimeters of mercury 130 systolic and 90 diastolic

Laboratory studies revealed the following values urea 30 mg, blood sugar 200 mg, blood chloride 446 mg total proteins 7 mg, albumin 4 6 mg and globulin 2 4 mg per hundred cubic centimeters The value for carbon dioxide was 65 volumes per cent The specific gravity of the urine was 1 027 No sugar was present, and there was no albumin Microscopic examination gave negative results

The erythrocyte count was 5,400,000 per cubic millimeter of blood, with 82 per cent hemoglobin The hematocrit reading was 37 per cent The leukocyte count per cubic millimeter of blood was 11,800 with 50 per cent polymorphonuclear cells 40 per cent lymphocytes and 4 per cent stab cells On administration of intravenous fluids the value for urea fell to 18 mg per hundred cubic centimeters, later the white blood cell count was 10 050 per cubic millimeter with 24 per cent lymphocytes 7 per cent monocytes and 15 per cent stab cells

Roentgen Examination—A flat plate of the abdomen revealed an obstruction in the midjejunum No radiopaque stones were noted There was air in the biliary tree, this was not noticed prior to the operation but was evident in retrospect

The patient was treated by intravenous therapy to correct the electrolytic imbalance and mild alkalosis A Miller Abbott tube was introduced After twenty four hours the symptoms persisted and, because of a rising temperature and pulse, an increased shift to the left in the polymorphonuclear cell count and slight abdominal tenderness an operation was deemed advisable A left rectus incision was made, and the stone containing small bowel was delivered easily Enterotomy was performed and a small egg sized smooth stone measuring 2½ by 1 by ¾ inches (3 9 by 2 5 by 1 8 cm) was removed Palpation revealed a dense adhesive mass in the right upper abdominal quadrant, but no surgical attack on this area was initiated The immediate postoperative course was uneventful Three weeks later there was a sudden attack of fever chills and jaundice, with alteration of the urine and stools This attack, apparently cholangitis was treated conservatively with antibiotics, a protein high carbohydrate diet and vitamins Tests of liver function showed a 4 plus cephalin flocculation reaction and a positive result from the thymol turbidity test There have been no recurrent attacks, and for the past year roentgen studies have revealed no obvious fistula Tests of liver function have given consistently normal results At present no further surgical intervention is contemplated

COMMENT

The occurrence of gallstone ileus in a comparatively young male patient is most unusual The attack of pain in the right upper abdominal quadrant with fever which was interpreted as pneumonia in all probability was the pain associated with formation of the fistulous communication with the intestine or its breaking through The occasional bouts of fever and pain in the right upper quadrant following this initial attack were due either to cholelithiasis or to cholangitis The absence of jaundice favors the [illegible] possibility The roentgen [illegible] and the presence of [illegible] the biliary passage should have suggested the [illegible] preoperatively

In all cases [illegible] attention should be [illegible] possibility of ileus secondary to gallstones and evidence of air in the biliary passages is an important observation The elevation of temperature pulse rate and leukocyte count persisting despite Miller Abbott intubation suggests that circulatory changes were imminent and that operation was indicated The size of the stone in this case would have militated against passage through the ileocecal valve and obstruction in this area would have been complete Miller Abbott intubation must be cautiously watched and checked If obstruction is definite and response to conservative treatment is not evident surgical intervention without further delay is obligatory Despite the one bout of fever chills and jaundice with altered hepatic function an attack on the fistulous tract is not contemplated However should there be recurrent bouts of cholangitis or evidence of abnormal liver function this opinion may have to be revised

SUMMARY

An interesting case of gallstone ileus in a comparatively young man is presented with observations that should have suggested the diagnosis before operation [illegible] At tention is drawn to the criteria for diagnosis of this condition.

RÉSUMÉ

Un cas de calculs biliaires localisés dans l'iléus chez un malade relativement jeune est présenté. Les observations préopératoires qui auraient dû suggérer le diagnostic sont discutées. Les critériums de ce diagnostique sont énumerés.

RESUMEN

Se presenta un caso interesante de íleo de la vesícula biliar en un hombre relativamente joven, con los signos que debían haber indicado el diagnóstico antes de realizar la operación. Se llama la atención sobre las bases para el diagnóstico de esta afección.

RIASSUNTO

Presenta un interessante caso di ileo da calcolo biliare in un uomo relativamente giovane. Se un esame clinico piu' accurato fosse stato eseguito. la diagnosi sarebbe scaturita prima dell'operazione. L'A. trae argomento da questo caso per esporre i criteri clinici che facilitano una diagnosi preoperatoria.

ZUSAMMENFASSUNG

Es wird ein interessanter Fall von Darmverschluss durch Gallenstein bei einem verhaeltnismaessig jungen Mann vorgestellt, bei dem gewisse Beobachtungen schon vor der Operation zur Diagnose gefuehrt haben sollten. Es wird auf die Kennzeichen, die zur Diagnose fuehren koennen, aufmerksam gemacht.

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Many people get along with the barest minimum of sleep and yet to all outward appearances are perfectly healthy and even live to advanced age. One prominent example is Thomas Edison, who is now well advanced in years and who was accustomed to get only an hour or two of sleep during his most creative period. The same was true of Napoleon, if we may believe his biographers.

The important thing to remember is that these men did not worry about their insomnia. They took it for granted and did not let it interfere with more important affairs of life. The typical insomniac, however, worries about his trouble incessantly, until it dominates his whole life. It is not so much the insomnia that makes him sick, as it is what he thinks about his insomnia.

. . . Sleep, like most of the subconscious parts of bodily activity, is badly deranged as soon as the conscious mind begins to concern itself with such affairs. The heart-beat is entirely beyond our voluntary control. It goes along very well without our consciousness. When a fellow begins feeling and counting his own pulse, then trouble starts.

An applicable story is the one of the old man with the long beard. Somebody asked him whether he slept with the beard outside or inside the bedclothes. He did not know. It had never occurred to him, but he said he would find out that night. So he tried it inside and that did not seem right, and he tried it outside and that did not seem right. He died of exhaustion, so they say, from rearranging his beard.

—Logan Clendening

Pentothal Sodium in Ophthalmic Surgery

A Ten-Year Review of Its Use at the Pittsburgh Eye and Ear Hospital

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INTRAVENOUS pentothal sodium (thiopental sodium) has become well established as one of the most useful of general anesthetics. It has been more widely used each year for the past fifteen years and is still increasing in popularity. First used in ophthalmic surgery at the Eye and Ear hospital in 1938 it was immediately recognized as an ideal anesthetic for this purpose and was adopted for general use from that time on. The present study was made to evaluate its use over a ten year period.

General Considerations.—Long and Ochsner[1] reviewed the literature on pentothal sodium in detail in 1942. I shall refer only to some of the pertinent points and to additional knowledge gained since that time.

Pentothal is one of the short acting barbiturates. An important chemical component is sulfur, a fact that must be considered in contemplating an operation with pentothal anesthesia on a person taking sulfonamides. Lundy[2] has noted general malaise and jaundice when the two drugs are used at the same time. He therefore recommends that sulfonamides be discontinued for twenty four hours prior to the administration of pentothal.

Pentothal is apparently rapidly detoxified by all of the tissues of the body. Animal experiments[3] have demonstrated that the liver and the kidneys are not important in its destruction or elimination. Clinical experience with pentothal in patients with extensive hepatic or renal damage seems to confirm these experiments, because few untoward effects have resulted. This is in sharp contrast to pentobarbital and amytal, which are unchanged in the body and are excreted from the kidney for seventy two hours. Veal and Reynolds,[4] however, have demonstrated a cumulative effect of pentothal in experimental animals after repeated doses. One must consider this effect when using the drug for long surgical procedures. We have observed a longer recovery period in cases in which pentothal was used for a long time. This would confirm the existence of a cumulative effect.

Pentothal causes a distinct depression of respiration, evidenced by shallowness of breathing without change in rate. Oxygen must be administered throughout anesthesia to prevent anoxemia and its complications. We have frequently administered coramine along with pentothal to combat respiratory depression. Adriani and Rovenstine have demonstrated [illegible] pentothal [illegible] [illegible] that [illegible] important [illegible] early [illegible] [illegible] [illegible] intravenous [illegible] anesthesia [illegible] its treatment.

The effects [illegible] are mild. Statistics [illegible] blood pressure [illegible] considered significant [illegible] Experimental work with [illegible] Reynolds [illegible] cardiac depression on prolonged administration of pentothal. However, this effect has not been found important in clinical studies. Hunter[10] has recommended the use of coramine for the pallor, tachycardia and poor radial pulse that may occasionally occur during the postanesthetic period. Thomas and McCaslin[11] have recommended the routine use of coramine to dilate the coronary vessels in all patients over 50 years of age. In their opinion it insures adequate cardiac circulation. Phlebitis and thrombosis[1] of the veins of the arm in which the pentothal is administered have

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Submitted for publication June 1, 19[illegible] occurred, but are uncommon when a 2.5 per cent solution is used.

Death from overdosage of pentothal is apparently the result of respiratory paralysis. The most important recommended antidotes to this anesthetic are picrotoxin, metrazol, oxygen and coramine.[13] The attempt is directed primarily toward stimulating respiration, and it must be made certain that the airway is open. Recently the administration of sodium succinate intravenously has been recommended, both as an antidote[14] and to shorten the duration of anesthesia.[15] Although the experimental work of others[16] has failed to confirm these effects, some variations of technic were used. Further investigations with succinate are warranted before it is discarded.

Young children do not tolerate pentothal as well as adults. A greater dose per kilogram of body weight is necessary, probably because of the higher metabolic rate, which reduces the margin of safety and complicates the problem of obtaining satisfactory relaxation. The smaller airway in children favors anoxia. Often the small veins and poor cooperation add to the problem. Most writers do not recommend pentothal for patients under 10 years of age.

Pentothal has been reported by Bodman and Farr[17] as producing convulsions. This is extremely rare, and no other report of this type has been found in the literature.

The preparation is contraindicated for operations on the neck because of its effects on the carotid sinus, which accentuate the respiratory depression.

Ophthalmologic Considerations.—Pentothal was recognized as a valuable anesthetic for ophthalmic surgery at an early date. All authors reporting have been enthusiastic,[18] with the single exception of Falls.[19] The incidence of complications was much higher in his report than in any other. It is difficult to explain this difference in his series, because his general procedure was the same as that of most authors.

The characteristics of pentothal anesthesia are particularly suited for ocular surgery. Most operations on the eye are of short duration, so that one usually does not have to consider the cumulative effect. The only harmful effect of prolonged pentothal anesthesia that I have noticed is the slow recovery period. At times this delay may overburden the nursing staff, because a nurse's attendance is required until the patient reacts. Most patients with ocular diseases are elderly, and it is this age group which tolerates pentothal best. In the elderly and asthenic patient, less of the drug is required for adequate anesthesia. Many patients requiring operations for cataract or glaucoma have hypertension, diabetes, or advanced arteriosclerosis. Froschauer and Schrimpf[18e] have noted little difficulty with pentothal in any of these complicating conditions, and my experience has been similar. Cardiac irregularities have apparently been unaffected by pentothal.[20] The absence of excitement in the second stage of anesthesia is a particular advantage in the presence of hypertension and nephritis. In these conditions the shock to the nervous system is no doubt less than if a local anesthetic were used.

Nausea and vomiting following pentothal anesthesia are not common and may be caused by the preoperative medication rather than by the barbiturate itself. These do occur, however, and are more frequent than after local anesthesia.

The respirations are quiet, causing no movement of the head during the operation. Finally, the anesthetist is located away from the operative field and in no way interferes with any operative procedure taking place about the eye.

A lowering of intraocular pressure is desirable in all operations for cataract or glaucoma. Panzardi[21] has observed a lowering of the intraocular tension averaging 7.5 mm. of mercury (Schiotz) in patients under pentothal. This eliminates the necessity for a retrobulbar injection, which may be accompanied by complications.

AUXILIARY MEDICATION

Although pentothal may be used alone for anesthesia, various drugs may be employed that improve it as an anesthetic agent and tend to increase its safety:

Atropine.—Preoperative administration of atropine is essential to a safe and quiet pentothal anesthesia. It not only prevents bronchospasm and laryngospasm but reduces secretion along the respiratory passages that might obstruct the airway I use atropine sulfate (gr 1/100) half an hour before operation

Opiate —An opiate given prior to the administration of pentothal is helpful in sedation and in relief of mental anxiety In this way it contributes indirectly to a smooth anesthesia It is not, however, as important as the atropine I use morphine sulfate (gr 1 6) half an hour before the operation If for some reason morphine is contraindicated demerol (100 mg) may be substituted

Local Anesthesia and Akinesia —The administration of topical anesthesia is an essential aid to pentothal It prevents the necessity of anesthesia so deep as to be unsafe Subconjunctival and retrobulbar anesthesia along with lid akinesia is optional Froschauer and Schrimpf[15a] feel that these forms of anesthesia decrease the amount of pentothal required They found only 3 to 10 gr necessary I average 15 gr without the additional local anesthesia and do not feel that this difference in amount is significant I therefore recommend only topical anesthesia

Curare and Curare-Like Compounds —The most recent adjunct to pentothal anesthesia is the curare group of compounds The chief purposes of curare are to aid in muscular relaxation and to provide the possibility of adequate anesthesia with a reduced dose of pentothal Muscular relaxation is more important to the abdominal than to the ophthalmic surgeon However, the reduced dose of pentothal required is important to all surgeons It results in a more rapid recovery from anes hesia, which is of particular value in opera ions of long duration

The reader is referred to the review of the iterature on curare by Robbins and Landy or an excellent summary of its properties urare acts by increasing the threshold of he muscles to acetylcholine For this reason is contraindicated in cases of myasthenia avis The action appears first in the extra ular muscles and the orbicularis oculi The uscles of the face, neck, throat, trunk and tremities are affected thereafter in succes n The diaphragm is last to be paralyzed rby[23] has used curare in combination with local anesthesia to produce immobility of the eyeball I have confirmed his success with this procedure, but a report of that procedure is not within the scope of this presentation

Pick and Richard[24] have noted a synergistic action of curare and barbiturates in experimental animals Their work may serve as a basis for assuming that the dose of pentothal is reduced when curare is used My experience in a limited number of cases has not confirmed this assumption, as will be noted later

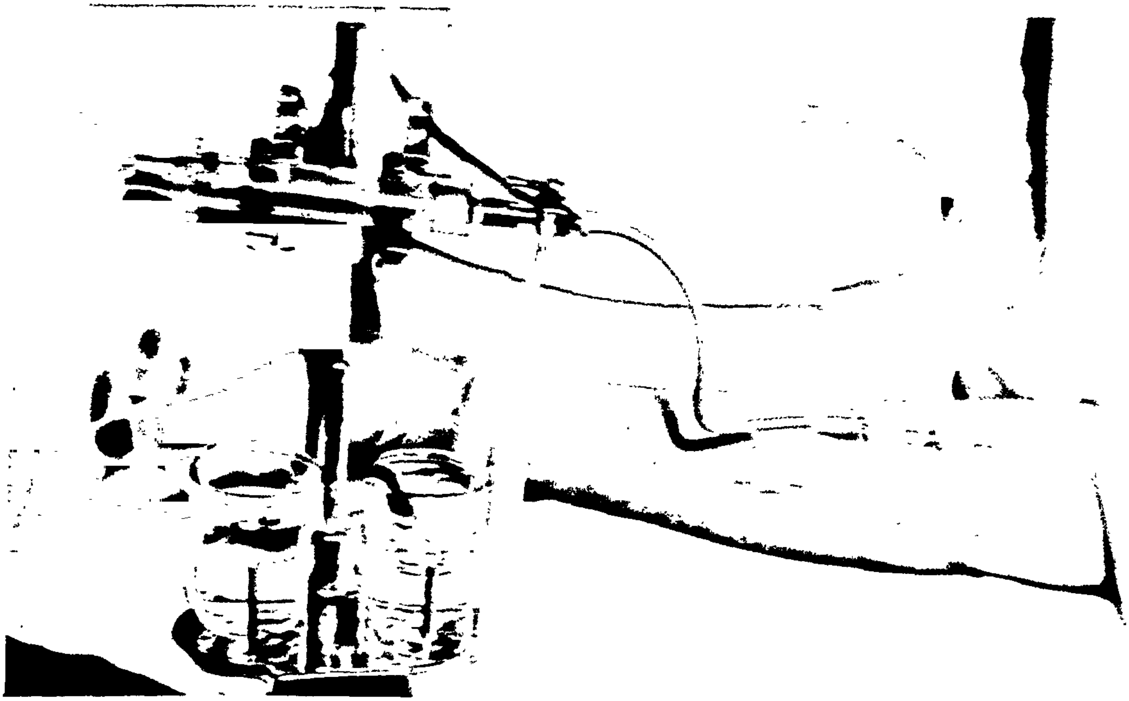
Curare is excreted by the kidneys and therefore is contraindicated in cases of impaired renal function It has been very valuable in facilitating pentothal anesthesia in heavy smokers and alcoholic patients, because patients of this type frequently require an excessive amount of pentothal if curare is not used

Although several forms of curare are available for clinical use, our experience has been primarily with D tubocurarine chloride A dose of 20 to 60 units of curare may be administered intravenously with pentothal, but care must be taken not to inject more than 1 cc per minute Curare cannot be mixed with pentothal, as a precipitate is formed It is a simple procedure to administer the two drugs through the same needle when suitable apparatus is available The entire system may be cleared with saline solution before the other drug is used Baird[25] has recently administered a buffered mixture of pentothal and curare with success However, he has not yet had a long enough series of anesthesias with this mixture for final conclusions to be drawn

Antidotes for curare must be available whenever it is used Neostigmine (prostigmine) and eserine are most important, although oxygen and facilities for artificial respiration must also be available

MODE OF ADMINISTRATION

A capable anesthetist with a thorough knowledge of the characteristics of pentothal and curare, if the latter is used, is essential for safe anesthesia The intermittent method of administration has been accepted as the best by most anesthetists By this method additional pentothal is administered only as needed



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1949, pentothal sodium was administered for 4,083 ophthalmic operations Of these, 1,733 were included in a previous report by Thomas and McCaslin[11] The total group constitutes 46 8 per cent of the eye operations performed during the same period Table 1 lists the number of operations of each type performed with pentothal, the average amount of pentothal required, and the average duration of the operation The duration varied from five to one hundred minutes and the amount of pentothal required varied from 3 to 45 grains The anesthesia has been found equally satisfactory in all types of ophthalmic surgery The average amount of pentothal required varied little with the type of operation but was almost directly proportional to the time required for the procedure The variation in dosage required can no doubt be correlated with the age of the patient In my experience there is no procedure in ocular surgery for which pentothal is contraindicated

There were relatively few complications in the entire series Nausea and vomiting occurred in about 4 per cent of the patients It was difficult to determine the actual number in which the recovery period was prolonged The patients usually were awake in fifteen to thirty minutes but lapsed back into a physiologic sleep lasting several hours They could be awakened at any time during this period When awake they felt refreshed and relaxed I feel that this is a material aid to normal recovery and healing of the surgical trauma When a prolonged reaction time did result it invariably followed a long operation in which considerable pentothal was used This reaction is, no doubt the result of the cumulative effect but no harm has resulted in any of our cases

An oropharyngeal airway was used in 72 per cent of the cases and a tongue suture in 4 per cent In the remaining 24 per cent nothing was applied to maintain a free airway The only disadvantage of the tongue suture is that the patient complains of a sore tongue for a day [illegible] In [illegible] case has this condition been

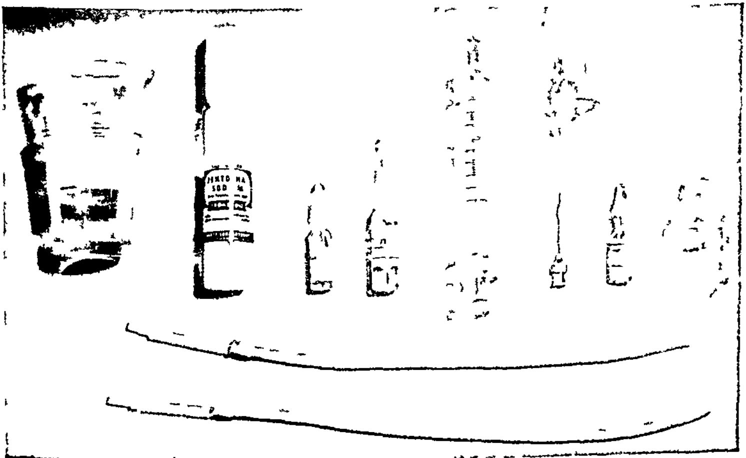

Fig 2—Essential materials for administration of pentothal and curare Two 1 ounce medicine glasses, an ampule of pentothal sodium (15 gr), antidotes for pentothal sodium (coramine and metrazol) in ampules, a 10 cc syringe with three way stopcock and intravenous needle curare antidote (prostigmine), curare, and two rubber tubes with glass adapters The apparatus for holding the syringe is omitted from the photograph

TABLE 1.—*Pentothal Sodium in Ophthalmic Surgery*

Procedure	Number	Average dose (gr.)	Average time (min.)
1. Operation for cataract (all types)	2,306	14	23.5
2. Operation for glaucoma (all types)	324	13	25
3. Operation on lacrimal apparatus	11	15.5	34
4. Operation for detached retina	163	20	39.5
5. Operation for strabismus	319	15.5	32
6. Enucleation and evisceration	125	15	33
7. Exenteration	7	22	58
8. Iridectomy and iridotomy	254	8	15
9. Operation on lid	86	19	39
10. Operation on cornea and conjunctiva	104	14	23
11. Magnet extractions	64	19.5	28
12. Miscellaneous	20	—	—
Total	4,083		

TABLE 2.—*Pentothal Sodium in Ophthalmic Surgery*

Case	Age of patient	Sex of patient	Amount of pentothal (gr.)	Interval between anesthesia and death	Operation	Cause of death
1	74	F	10	10 hours	Enucleation	Coronary occlusion
2	56	F	10	72 hours	Paracentesis	Coronary occlusion
3	56	F	8	0	Iridectomy	Pentothal
4	67	F	15	7 days	Iridectomy, tooth extraction	Coronary occlusion
5	86	F	7½	9 days	Cataract	Pneumonia
6	72	F	10	18 hours	Cataract	Coronary occlusion
7	[illegible]	M	11	13 hours	Cataract	Coronary occlusion
8	80	M	15½	22 days	Cataract	Coronary occlusion
9	80	F	12	11 days	Cataract	Coronary occlusion (autopsy)
10	90	F	7½		Cataract	
			3		Prolapse of iris	Coronary occlusion; pentothal? (autopsy)
			(5 days later)	20 hours		
11	73	M	12	6 days	Cataract	Cerebral hemorrhage
12	75	M	12	27 days	Cataract	Bronchopneumonia (autopsy)
13	75	F	8	18 days	Cataract	Bilateral lobar; pneumonia
14	70	M	6	51 days	Glaucoma	Lobar pneumonia; lung abscess (autopsy)

severe Coramine (to stimulate respiration) was given during the operation or immediately after it in 16 per cent of the cases. No harmful effect has been observed from the coramine

In this ten-year study curare was given to treat laryngospasm or along with the pentothal [illegible] 7 times. We do have records of 44 cataract operations performed with pentothal and curare this year. In these cases the average amount of pentothal used was 15.5 gr. and the average duration of the operation was twenty-six minutes. In comparing these figures with those for the ten-year period in which no curare was used, it is noted that approximately the same amount of pentothal was required. This fact tends to disprove the assumption that curare enables one to use less pentothal. The true answer cannot be brought out until more experience with the combined use of these drugs has been accumulated

Fourteen patients who received pentothal in this group died during the postoperative period (Table 2) but only 1 death can be definitely attributed to pentothal (Case 3). In Case 10 the autopsy observations indicative of coronary disease were not sufficient to determine whether or not pentothal was a factor. The autopsy also revealed nephritis, hypertension, chronic hepatitis and cholecystitis were contributory causes of death. At the patient's advanced age even a minor condition added to the others might have caused death. I do not feel warranted in placing the blame on pentothal.

In Cases 1, 2 and 7, the time that elapsed after the anesthesia may suggest pentothal as a cause of death, but in each of these cases complete recovery from the anesthesia had occurred. The history and progress of symptoms along with physical signs and electrocardiograms in 1 instance, left no doubt as to the diagnosis of coronary occlusion.

The high incidence of coronary occlusion might suggest pentothal as a cause of thrombosis of the coronary arteries. I do not feel that the incidence of coronary accidents is any higher in this group than in a corresponding series in which local anesthesia was employed. In my opinion the incidence is lower. It would be interesting to compare this group with a group of such patients in whose cases local anesthesia was used.

SUMMARY

1. A brief review of the literature on pentothal sodium anesthesia is presented with particular reference to its use in ophthalmic surgery.
2. An analysis of the use of this drug as an anesthetic agent in ophthalmic surgery in 4,083 cases over a ten year period is presented.
3. The author concludes that pentothal sodium is an ideal and safe anesthetic for ophthalmic operative procedures.

RESUME

1. Une revue tres breve de la literature concernant l'emploi de penthotal sodium comme anesthesique est presentee et en particulier ses rapports avec la chirurgie ophthalmique.
2. L'analyse de l'emploi de ce produit comme agent anesthesique dans la chirurgie ophthalmique durant une periode de dix ans dans 4 083 cas est presentee.
3. L'auteur conclut que le penthotal sodium est un anesthesique sur et ideal pour les operations ophthalmiques.

RESUMEN

1. Se revisa brevemente la literatura sobre pentotal sodico haciendo mencion especial de su uso en cirugia oftalmologica.
2. Se presenta un analisis del uso de esta droga como agente anestesico en cirugia oftalmologica en 4083 casos durante un periodo de 10 anos.
3. Se concluye que el pentotal sodico es un anestesico ideal e innocuo en las intervenciones oftalmologicas.

ZUSAMMENFASSUNG

1. [illegible] wird eine kurze Uebersicht der Literatur ueber die Anaesthesie mit Pentothalnatrium gegeben und auf ihre Anwendung in der Augenchirurgie besonders eingegangen.
2. Die Anwendung des Mittels als Ana[illegible] [illegible] Augenchirurgie wird in einer [illegible] 4083 Faellen die in einer Periode [illegible] beobachtet wurden [illegible]
3. Die Schlussfolgerung [illegible] des Pentothalnatrium [illegible] ideales und sicheres Anaesthetikum fuer ophthalmologische Operationen darstellt.

RIASSUNTO

1. Breve rassegna storica dell'anestesia con pentotal sodico con speciale riguardo al suo impiego nella chirurgia oculare.
2. Discussione sopra i risultati di questa anestesia in 4083 casi operati in un periodo di 10 anni.
3. L'A. conclude affermando che il pentotal sodico offre un'anestesia ideale nella chirurgia dell'occhio.

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LA PRESSE MEDICALE

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Editorial

Joint Enterprise: II. The Illustrations

It takes approximately three and one-half pages of double spaced typescript to fill one text page of the Journal of the International College of Surgeons

Does this seem an odd sentence to introduce a communication about illustrations? It may, to the uninitiated The fact remains that it has important bearing upon the subject Every contributor should bear in mind that any paper of less than fifteen pages of typescript, double spaced, is a "short" paper and that the number of illustrations it will carry is strictly limited

We realize, as fully as do our authors, how much interest and value is added to an article by fine drawings, photographs and charts We are aware of the fact that, as someone has aptly said, "one picture can accomplish as much as ten thousand words of text" We sincerely appreciate the generosity of our contributors in this respect and the almost uniformly high quality of the illustrations submitted But we are faced every month with the problem of laying out brief articles that cannot be made to cover the space required for the accompanying illustrations What to do?

Well, there are several possibilities First, we can write to the author and suggest reducing the number of cuts or lengthening the article Both expedients are time consuming and result in delayed publication If the author consents to reduce the number of cuts, he usually wants them returned to him for the purpose To lengthen the article is, as a rule, unwise, presumably the author has covered his subject in the first place, and the need of expansion is apt to result in "padding" We are doing the author no favor if we suggest it The inclusion of a great many pictures however impressive, will compensate neither the author nor the *Journal* for loss of the article's quality

Second, we can—and frequently do—reduce the number of cuts by combining two or more which have a clear relation to one another This method is very good as far as it goes Unfortunately, however, the shape, nature or sequence of the cuts may be such as to make it impossible For example we may note that Figure 4 and Figure 6 would combine nicely but there is Figure 5 to be reckoned with and Figure 5 is a circular photomicrograph that cannot be combined with either of the others There is also the dire possibility that even after all possible combinations have been made, the number of cuts is still disproportionate to the length of the article The printers cannot help us here, they cannot stretch the article to conform, as they dourly point out to us, they have no rubber type!

Third, we can—as a last resort and only if the article is an extremely short one—lengthen it by having it translated *in toto* into the four foreign languages ordinarily used for summaries alone This is undesirable for several reasons, the chief one being that the author is not left much choice in the matter of his reprints He must include the translations in the reprints or leave most of his illustrations adrift in a sea of blank space The cost of the reprints, which is based on the number of pages included, is of course proportionately increased

The solution of this problem, accordingly rests chiefly with the author While the manuscript is in preparation the author should estimate the approximate number of *Journal* pages it will require and arrange his illustrations on that basis A little judicious selection is in order For example, if he is reporting a series of similar cases, he should select two or three representative roentgenograms drawings or photomicrographs indicative of the lesion or its treatment, as the case may be, these, with carefully written legends will often serve as well to point up the article as would a separate picture for each case Only if the article is a long one—twenty pages or more of double spaced typescript—should more than half a dozen pictures accompany it

Preparation of Illustrations.—Illustrations for the *Journal* are of three main types: (*1*) halftones, (*2*) charts, diagrams and line drawings and (*3*) color plates. The great majority, including all roentgenograms and most photomicrographs,* are reproduced as halftones. Charts, diagrams and line drawings are reproduced as zinc etchings, a less expensive process but strictly limited to illustrations without shading. Color plates, which are magnificently effective but extremely high in cost, are used at the author's discretion. Sometimes an author submits a fine color plate without realizing in advance the cost of reproduction. In such a case two estimates are always sent, one for color and one for ordinary halftone (black and white); the astronomic difference usually leads the author to choose the latter, and our engravers have no difficulty in obtaining a halftone cut of excellent quality. There is therefore no reason to withhold a good color print because of the cost of color reproduction.

With this background in mind, the author in preparing his selected illustrations should give special attention to the following points:

1. Submit all illustrations flat and in good condition, either loose or mounted but *never pasted to the pages of the text.* If they are so pasted and cannot be loosened without damage, the manuscript must be cut to ribbons and reassembled before it can be edited. Photographs for halftone reproduction should be glossy prints of the best obtainable quality and should be so packed as to protect them against creasing or bending, the effects of which will show in the reproduced cut. Paper clips should never be used, nor should staples; the former will leave a mark, the latter leave holes.

2. All illustrations should be clearly identified and oriented by the words "Figure—" and "Top" clearly typed on a label pasted on the reverse side. (The typewriter, a pen or even a pencil may dent the surface.) The author's name and address should appear here also. *These directions are extremely important.* If the top of the picture is not indicated and is not perfectly evident from the picture itself, trouble may result.

3. A *list of legends* numbered to correspond (Figure 1, Figure 2, Figure 3, etc.) *should be sent with the manuscript on a separate page or pages.* Legends may be short or long as occasion requires. They should contain all the descriptive matter necessary to understanding of the picture, so that marks on the picture itself may be kept to a minimum. Unless the author is an artist at lettering, the writing or printing of explanatory letters, words and phrases on the picture itself is to be deplored. They often ruin an otherwise excellent effect and must be removed by the engravers, after which the Editorial Staff must rewrite the legend to include them. The author naturally prefers to write his own legends, and if he will bear this in mind from the beginning he will avoid possible annoyance and delay.

If the illustrations and the legends are correctly numbered to correspond, there is no danger of confusion. *It is therefore unnecessary and undesirable to write the legends either on the backs of the pictures or on strips attached to them.* Legends do not go with the pictures to the engraver; therefore, if either of these methods is used, all the legends must be copied in sequence on a separate page in the Editorial Office in order that they may accompany the manuscript to the printer.

If *large photomicrographs* are submitted, the author should indicate whether they may be reduced and, if so, how much and by what method. We never reduce photomicrographs without permission. There are two possible methods of reduction; (*a*) the usual photographic process and (*b*) "cropping," i.e., omitting all but the significant areas. If the latter method is to be used, the author should indicate plainly how far these areas extend. If he is willing to have the magnification reduced, he should add "Reduce if necessary" to the data on the label pasted on the back of each picture.

A little study of *Journal* illustrations, with these facts in mind, would prove permanently valuable to any contributor. Let him note the size of the *Journal* page and the proportion of pictures to text as regards both size and number. Careful perusal of several legends, both short and long, will clarify his own ideas in this respect. The writing of clear, concise legends is an art in itself, and can be an enjoyable mental exercise Though nothing essential should ever be omitted, most legends could be shortened to advantage, it is unnecessary, for example to repeat whole paragraphs of the text when the laconic reference "See text" is sufficient Reference to a particular case can be covered neatly by mentioning it in the legend, thus "Fig — (Case —)'

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*Photomicrographs may also appear in color

Not infrequently an author will object to the *placing* of his illustrations, thus "I refer to Figure 8 on Page 70 and it has been inserted on Page 75 Please try to avoid this sort of confusion in the future" To this complaint there is only one reply "Dear Dr X, we have tried and do try to avoid it We are as much concerned as you can be with the avoidance of confusion of every kind and we should like nothing better than to place Figure 8 on Page 70, exactly where you have referred the reader to it Unfortunately, however, *seven illustrations precede Figure 8, and your article begins on Page 69*" The implication is obvious As a matter of fact, the "confusion" resulting from the placing of Figure 8 is negligible if the illustration is properly numbered Few readers will object to the physical labor of turning a page or two if they are genuinely interested in what the author has to say

The fewer the illustrations submitted of course, the more likelihood there is that they can be inserted parallel with the author's reference Laying out a large journal page by page, however and correlating text with illustrations even approximately is a task more difficult than anyone can realize who has not actually tried it

For this reason and a number of others we hope that the foregoing brief resume of the problems involved will clarify matters for our contributors as well as for the Editorial Staff The cost of illustrating an article effectively is not inconsiderable and it is in the author's own interest to economize in time as well as expense The author who takes comparatively slight trouble to observe all recommended precautions will meet with a double reward He will know that he has protected his manuscript from the possible mistakes of others and he will have the satisfaction by no means a slight one that attends a good job competently done Last but not least from the Editor's point of view he will carry the Editor's blessing wherever he goes!

M I

The House of Delegates

of the

United States Chapter, International College of Surgeons

will convene in the

Empire Room

Cleveland Hotel, Cleveland, Ohio

on Monday, October 30

promptly at 2 p m

New Horizons

By the Editor

The Argentine Assembly
Southern Hospitality, Unlimited

The Seventh Assembly of the International College of Surgeons, held in Buenos Aires with the enthusiastic aid and cooperation of the Argentine Government and marked by a hospitality so lavishly gracious that only the word "magnificent" can do it justice, was an occasion long to be remembered and one that sets up a new milestone on the highway to scientific fulfillment and world-wide fraternal relations. The International College, which was founded as an exponent of these two ideals and maintains a steadfast pursuit of the goal, has never encountered greater understanding, sympathy and encouragement. Our activities were facilitated in advance by a handsome grant from the Government for that express purpose. The President, General Juan Peron, and his justly celebrated wife. Señora Eva Peron, gave unstintedly of their time and personal attention, welcoming without reservation the liberal exchange of opinions and displaying an open-mindness on controversial subjects that augurs well for the future of Argentina. A spirit of unreserved international good will was manifest throughout, and despite the splendor, pageantry and picturesqueness of the background and the essential formality of the occasion, no informal gathering could have been more fully pervaded by warmth, geniality and relaxation.

Some 300 surgeons attended from the United States. Most of them made the journey on a boat of the Moore-McCormick line, specially chartered from Uruguay; for these the voyage was highlighted by a scientific symposium en route, at which many stimulating papers were presented and discussed. Among the leaders of this interesting odyssey were Dr. Henry W. Meyerding, Dr. Custis Lee Hall, Dr. Harry E. Bacon, Dr. R. J. Behan, Dr. Moses Behrend and Dr. Leigh F. Watson. Others traveled by air. All, on their arrival, were greeted with the cordiality of old acquaintance, and the diversified program took place in a satisfying crescendo of interest, amity and enjoyment.

It is an abiding satisfaction to report that in this Assembly, as in every new coming together of the College, the steady growth of the organization in membership throughout the world was more than paralleled by the increasing scientific value of the presentations offered. No surgeon whose heart is in his work can remain unmoved by such an experience; one's vision and courage are strengthened. one's intellectual range broadened and one's understanding of world problems invested with new depth.

The Assembly program left no surgical field unexplored. Not only clinical but experimental surgery was emphasized. Special presentations in gynecology and obstetrics. neurosurgery, orthopedics, plastic surgery, roentgenology, war injuries, surgery of the endocrine glands, chemotherapy and the use of antibiotics were highlighted, in addition to expositions of surgical technic for all parts of the human body. Some 4,000 persons packed the auditorium—visitors from all over the world, specialists and general surgeons from countries once far removed but now brought close together by modern communication, transportation and the shared ideal of worldwide fraternity. It was a participating audience; each successive paper was greeted with generous acclaim, and the swift exchange of ideas became almost a visible and palpable entity among us.

The Argentine Chapter, though comparatively young, has an impressive record of rapid growth and general solidity. A permanent Commission has been established for the furtherance of its aims, and a fine building has been set aside by the Government as its permanent headquarters. All members of the Chapter seem imbued with the spirit of scientific progress and with an energetic desire to increase the effectiveness of their work.

The hospitality of our hosts reached its climax in a special luncheon given in the gardens of the Presidential Palace, in a pavilion especially prepared for the occasion and presided over by General Peron and his charming Señora There was a resplendent display of flags, not only of Argentina but of all the nations represented About 1,500 persons were present Between courses we were entertained by brilliantly staged features demonstrating age old traditions and the colorful folklore of Argentina Music, dancing and native arts and crafts were brought forward in an unforgettable manner, leaving us with a totally new understanding of our neighbors to the south and a permanent and intimate sense of personal acquaintance

Guests at the Presidential table included Dr Max Thorek, Founder, and Dr Herbert Acuff, President, of the International College of Surgeons, Dr Jorge Taiana, Director of the Evita Peron Social Aid Foundation, Dr Ricardo Finocchietto, Minister of Education and Public Health, Drs Armando Mendez San Martin and Ramon Carrillo, the Administrative Secretary to the President, Major Carlos V Aloe, and the Assistant Secretary of Information, Señor Raul A Apold

After luncheon General Peron spoke briefly an interpreter translating his remarks into English "In our country," he said, "there is a tradition of friendship For Argentinians this same friendship, which can unite two individuals or two peoples, is a friendship that has come down to us through the ages and which we still find throughout our Republic It is our hope that the delegates who have been with us during the past few days will carry back with them the assurance that we are their friends The surgeon is always face to face with suffering humanity, always working for the benefit of mankind This is our own ideal Because of this, we know that surgeons are men of good will, and we feel that those who devote their lives to the benefit of humanity should be united and keep in close touch with one another

"We are working for the same goal and we shall always be united as friends and servants one of the other We are delighted to have had these visitors with us and hope that they will come again They will always be welcomed here with open hearts and open arms"

The President followed this greeting with some highly interesting comments upon the status and progress of medical and surgical science in Argentina He spoke of unfortunate conditions which the present Government having a high realization of the vital importance of health to the future of the nation is striving to correct "We have been able in the course of four years he said 'to eradicate malaria from one of the largest malarial districts on the American Continent We have added a policy of public health that has resulted in the founding of hospitals and public health services all over the country There is still a scarcity of doctors The health of the children is what interests us most because we are working steadfastly toward the future

From the scientific point of view surgical art, science and technic are very well developed here, but surgery is still exceedingly costly and we have not yet any organization capable of meeting all surgical needs We are striving to make expert surgical aid available to all of our people, rich and poor alike During the past four years we have been able to add 30,000 to the number of hospital beds available throughout the Republic In this connection the Social Aid Fund, over which Señora Peron presides, has furnished and will furnish, by the end of the year 1952 another 15,000 hospital beds These 45,000 beds bring us within sight of what we are aiming at Later we hope and expect to be able to furnish specialized surgical services capable of attending to the needs of 17,000 000 Argentinians"

Señora Peron also spoke briefly, extending to the Assembly the love and welcome of the Argentine people "I wish to extend a cordial and affectionate welcome to the eminent personages in the world of surgery who are gathered together in this Congress We cannot doubt that the present gathering will go down in history as an example among meetings of this nature for its unanimity of purpose and the nobility of its ambitions Such desires as these confer upon men their highest dignity and justify the highest hopes of collaboration and cooperation for the health and welfare of the nations

The deep appreciation of the United States

Chapter was expressed in short addresses by Dr. Thorek and Dr. Acuff. Special acknowledgement was made to Dr. Carillo, the Minister of Public Health and Education, and Prof. Dr. Taiana, Director of the Social Aid Foundation, for their generous efforts in behalf of the Assembly. Dr. Taiana then responded for Argentina, also expressing gratitude for the excellent cooperation of University faculties and hospital staffs in planning for the occassion.

During the course of the Assembly, the Embassies of Peru, Spain, Finland, Bolivia, Brazil and the United States bade us welcome by formal receptions given in honor of the College. These occasions, both distinguished and distinctive, will never be forgotten by those who attended them. The acknowledgement they imply is no small honor to the International College of Surgeons. It is clear that our aims and purposes, as well as our achievements thus far, have won the recognition we hope and believe they deserve. Perhaps this should be no surprise; but in every great enterprise the spirit of humility, a natural outgrowth of the immensity of the task, pervades most deeply those who work hardest for its completion, and such rich rewards are always unexpected. They are none the less delightful for all that, and none the less appreciated and treasured in memory.

The test of biological variations and mutations is whether they lead to increasing fitness, and the test of all social and moral mutations and revolutions, such as those of today, is whether they lead to increasing perfection and progress. The great principle of the survival of the fit has guided evolution from amœba to man, from tropisms and reflexes to intelligence and consciousness, from solitary individuals to social organizations, from instincts to ethics; and this great principle will not be abrogated today or tomorrow. It is the "power, not ourselves. that makes for righteousness." Man can consciously hasten or hinder this process, but he cannot permanently destroy it. He can refuse to take part in it and can choose to be eliminated, but the past course of evolution for millions of years indicates that somewhere and somehow this process will go on.

The evolutionist is an incorrigible optimist; he reviews a billion years of evolution in the past and looks forward to perhaps another billion years of evolution in the future. He knows that evolution has not always been progressive: that there have been many eddies and back currents, and that the main current has sometimes meandered in many directions; and yet he knows that, on the whole, it has moved forward. Through all the ages evolution has been leading toward the wider intellectual horizons, the broader social outlooks, the more invigorating moral atmosphere of the great sea of truth.—Edwin Grant Conklin

General News Notes

Incunabula Catalogue Published: A complete catalogue of incunabula and manuscripts in the Army Medical Library has recently appeared. Three classes of works are included: (*1*) the incunabula, (*2*) early Western manuscripts in Latin, German, Italian and English, and (*3*) Oriental manuscripts in Arabic, Persian, Turkish, Singhalese and Hebrew. The sections on incunabula and early Western manuscripts were compiled by Dr. Dorothy M. Schullian and the section on Oriental manuscripts by Francis E. Sommer. The Catalogue is dedicated to the memory of John Shaw Billings. It is expected to fill a definite need.

Maxillofacial Surgery: The Annual Meeting of the American Society of Maxillofacial Surgeons was held from September 24 to 27 inclusive, in New York. Sessions were held at the Presbyterian Medical Center, the Memorial Hospital and the Manhattan Eye, Ear and Throat Hospital. A highly stimulating program was presented.

Ambulatory Fracture Association: The preliminary program of the Eleventh Annual Meeting of the Ambulatory Fracture Association, a notice of which appeared in our September issue, carries a cordial invitation from Dr. Custis Lee Hall, President, to all surgeons interested in fractures and traumatic surgery. The meeting will convene at the Gibson Hotel in Cincinnati, Ohio, October 16 to 19 inclusive.

Military Surgeons' Convention: Announcement is made of the 1950 Convention of the Association of Military Surgeons of the United States, to be held at the Statler Hotel in New York City, November 9 through November 11. Among the speakers scheduled to appear are Louis H. Bauer, M.D., F.A.C.P., Secretary of the World Medical Association, Howard A. Rusk, M.D., whose subjects will be "Total Rehabilitation in Total Mobilization". William F. MacFee, M.D., Surgical Director, St. Luke's Hospital, N. Y., "The Surgery of World War III."

Morris Weintrob, M.D., F.I.C.S., of Brooklyn, New York [Commander, MC, USNR] is chairman of the Scientific Exhibits Committee.

Tenth Dermatology Congress: During the summer of 1952 the Tenth International Congress of Dermatology will convene in London under the presidency of Sir Archibald Gray. It is requested that the secretaries of the various dermatologic societies of the world communicate with Dr. Gordon B. Mitchell-Heggs, Institute of Dermatology, St. John's Hospital, Lisle Street, Leicester Square, London, W.C. 2, in order to make certain that their names are included in the program.

Health Association Meeting: The American Public Health Association will hold its seventy eighth annual meeting in conjunction with 32 relative public health organizations at St. Louis, Missouri, from October 30 to November 3. The program includes practically every phase of hygiene and public health. Dr. Reginald M. Atwater is executive secretary of the association, whose address is 1790 Broadway, New York 19, New York.

Ophthalmologic Congress: The Fourth Pan-American Congress of Ophthalmology is slated to be held in Mexico City from January 6 to 12, 1952. An impressive program is in the formative stage, and those interested should communicate with the Secretary of the congress.

Federation of Physical Medicine: In London the International Federation of Physical Medicine convened recently for the purpose of promoting on an international basis the study and practice of physical medicine and for holding conferences on the same subject. The temporary chairman is Dr. Frank Krusen (Mayo Clinic, U.S.A.). Headquarters are in London. Those interested should address the British Association of Physical Medicine, 45 Lincoln's Inn Fields, London, W.C. 2. The first congress is to be called in London in July 1952.

Japanese Journal Resumes Publication: The Japanese Journal of Biochemistry, founded in 1922 and discontinued in 1944, has taken a new lease on life. It is the official organ of the Japanese Biochemical Society. Many brilliant publications and important papers of Japanese biochemists have appeared in this journal during the past. With its republication we may hope to see the fruits of Japanese scientific progress given world recognition. The Journal will appear quarterly from the Institute of Biochemistry, Tokyo University.

Travelling Fellowship: A travelling fellowship in Thoracic Surgery has been created by the American Association for Thoracic Surgery. The Society of Thoracic Surgeons of Great Britain and Ireland have been asked to nominate the first holder of the fellowship.

Chapter News

United States Chapter

Dr. Arnold S. Jackson, Secretary of the United States Chapter, presents the usual good report of progress.

Recent Honors: Dr. Rudolph Nissen of New York has declined an offer to take over the chair of surgery at the University of Hamburg, Germany.

Dr. Lyon H. Appleby, F.A.C.S., F.R.C.S. (England and Canada), who has been vice-president of the International College of Surgeons and was recently reappointed, has been made an Honorary Fellow of the American Proctological Society.

The Alumni Association of the New York University College of Medicine, a unit of the New York University-Bellevue Medical Center, has elected Dr. Sydney D. Weston, F.I.C.S., (Hon.) as its president.

Wisconsin Section: The Wisconsin Section of the United States Chapter, International College of Surgeons, met at the Hotel Schroeder in Milwaukee on Sunday, October 1. After the business meeting in the late afternoon the members reassembled for dinner, which was followed by the scientific program. Two outstanding papers were presented; "Surgery of the Extrahepatic Biliary System" by Dr. Maurice G. Rice of Stevens Point and "Endometriosis" by Dr. Eugene L. Dallwig of Milwaukee. A report of the Buenos Aires meeting of the International College of Surgeons was given by Dr. William C. Gnagi of Monroe. Dr. Arnold S. Jackson outlined plans and attractions for the forthcoming Assembly in Cleveland.

Southern California Section: The Second Annual Clinic Day program of the Southern California Section was presented at the Auditorium of the Los Angeles County Medical Association, Los Angeles, on September 13, with Dr. Donald C. Collins of Hollywood presiding. It was an all-day affair, including morning, afternoon and evening sessions. The guest speaker of the evening was Dr. Robertson Ward of San Francisco. Dr. Ward spoke on "Malignant Disease of the Thyroid Gland."

Alabama Surgical Section: The Alabama Surgical Section held its third annual assembly this year in collaboration with the Tuscaloosa Medical Society, at the Tuscaloosa Country Club of that city, on October 12. Presiding at the various sessions were Dr. A. M. Walker of Tuscaloosa; Dr. J. O. Morgan of Gadsden; Dr. H. E. Simon of Birmingham, and Dr. Gilbert Douglas, Chairman of the Board of Regents of the United States Chapter, who occupied the chair at the banquet. The speaker of the evening was Senator Lister Hill of Alabama. Dr. Max Thorek of Chicago, introduced by Dr. J. M. Galalee, President of the University of Alabama, spoke on the International College of Surgeons and its significance in the world today.

Southern Surgical Section: Dr. B. T. Beasley, Atlanta, Managing Editor of the *Southern Surgeon,* states that plans are proceeding for a meeting of the Southern Surgical Section of the College to be held at Atlanta, Jan. 12 and 13, 1951. This meeting is being directed by Dr. William P. Nicolson, Jr., Atlanta. Dr. Beasley is program chairman.

* * *

Costa Rican Chapter: The Costa Rican Chapter of the International College of Surgeons held its Annual Meeting on June 21, at which time the following officers were elected:

President	Dr. Jorge Vega Rodríguez
Vice-President	Dr. José A. Coto Garbanzo
Secretary	Dr. José M. Ortiz Céspedes
Ass't. Secretary	Dr. Rafael A. Núñez Hernández
Treasurer	Dr. Enrique Aguilar Alfaro

German Chapter: Professor Dr. Alexander Lezius has been appointed Professor of Surgery and Head of the Department of Surgery of the University of Hamburg, as well as Surgeon-in-Chief of the University Hospital, Hamburg-Eppendorf.

Professor Lezius, who has hitherto held the position of Chief Surgeon of the City Hospital of Luebeck, Germany, is Secretary of the German Chapter of the International College of Surgeons.

Indian Chapter: The following members of the United States Chapter participated in the Assembly of the Indian Chapter, held in Bombay on September 29 and 30 and October 1:

Dr. Elmer J. Ball, "Thyroglossal Duct Cyst"; Dr. Arnold S. Chaimov (presented a paper by Dr. S. N. Cooper, Bombay, "Dacryo-cystorhinostomy"); Dr. Lemuel D. Smith, "Hip Fractures"; Dr. George B. Callahan, "Intraperitoneal Perforations"; Dr. A. L. Delaney (presented a paper by Dr. E. A. DeSa of Bombay, "Hydrocephalus—A New Operative Procedure").

Final Program

Fifteenth Assembly
of the
INTERNATIONAL COLLEGE OF SURGEONS
United States Chapter

CLEVELAND PUBLIC AUDITORIUM, CLEVELAND, OHIO
October 31-November 1-3 Inclusive, 1950

Tuesday, October 31, 1950

MORNING SESSION

Presiding Lyon H [illegible], M.D., F.R.C.S. [illegible] R.C.S. Can., F.A.C.S., F.I.C.S., [illegible], Canada

Secretary [illegible] J [illegible], M.D., F.I.C.S., West [illegible], [illegible]

astric Symposium

9:00-9:15 [illegible], M.D.

[illegible]

15-9 [illegible] M.D.

[illegible]

[illegible]

[illegible]

[illegible] Rudolph [illegible]

[illegible]

"[illegible]"

11:15-11:30 [illegible], M.D., F.A.C.S.,

[illegible]

11:30-11:45 [illegible], M.D., F.I.C.S.,

[illegible]

[illegible], M.D., F.I.C.S., F.A.C.S.,

[illegible]

[illegible]

2:20- 2:40 **Sauer, Dean, M.D., F.A.C.S.,** St. Louis
Senior Instructor in Surgery, St. Louis University School of Medicine; Attending Surgeon, St. Louis City and St. Louis County Hospitals, St. Louis.
"Multiple Visceral Resections"

2:40- 3:00 **Thorlakson, Paul H. T., M.D., M.R.C.S. (Eng.), F.R.C.S. (C), F.A.C.S.,** Winnipeg, Canada
Associate Professor of Surgery, University of Manitoba; Director and Chief of Surgery, Winnipeg Clinic.
"Multiple Primary Foci of Carcinoma of the Colon"

3:00- 3:20 **Puestow, Charles B., M.D., F.A.C.S.,** Chicago
Chief, Surgical Service, Veterans Administration Hospital, Hines, Illinois; Senior Surgeon, Illinois Research and Educational Hospitals, Henrotin Hospital, Chicago.
"Causes of Postcholecystectomy Syndrome"

3:20- 3:40 **Curtis, George M., M.D., F.A.C.S., F.I.C.S. (Hon.),** Columbus, Ohio
Professor of Surgery, Ohio State University Medical School; Chief, Research Surgical Service, University Hospital.
"The Indications for Splenectomy"

3:40- 4:10 **Intermission to View Exhibits**

4:10- 4:30 **Monteiro, Alfredo, M.D., F.A.C.S., F.I.C.S. (Hon.),** Rio de Janeiro, Brazil

4:30- 4:50 **Witte, Dexter H., M.D., F.A.C.S., F.I.C.S.,** Milwaukee
Former Associate Clinical Professor of Surgery, Marquette University Medical School.
"Carcinoma of the Cervical Stump"

EVENING SESSION

8:00- 9:00 **Panel Discussion with Morning Speakers**
Moderator: Claude J. Hunt, M.D., F.A.C.S., F.I.C.S., Kansas City, Missouri

9:00-10:00 **Panel Discussion with Afternoon Speakers**
Moderator: Herbert Acuff, M.D., F.A.C.S., F.I.C.S., Knoxville, Tennessee

Wednesday, November 1, 1950

MORNING SESSION

Presiding: Gordon S. Fahrni, M.D., F.R.C.S. (Can.), F.A.C.S., F.I.C.S. (Hon.), Winnipeg, Canada
Secretary: Lindon Seed, M.D., F.I.C.S., Chicago, Illinois

Thyroid Symposium

9:00- 9:15 **Francis, Carl C., MD.**
Assistant Professor of Anatomy, Western Reserve University School of Medicine.
"Summary of the Surgical Anatomy of the Thyroid Gland"

9:15- 9:30 **Shipley, Reginald, M.D.**
Associate Professor of Medicine, Western Reserve University School of Medicine.
"Summary of the Physiology of the Thyroid Gland"

9:30- 9:45 **Graham, Allen, M.D., F.A.C.S.,** Pittsburgh
Associate Professor, Departments of Surgery and Pathology, Western Reserve University School of Medicine; Surgical Pathologist, Cleveland Clinic Foundation; Pathologist, Western Pennsylvania Hospital, Pittsburgh.
"Criteria of Thyroid Malignancy"

9:45-10:00 **Davison, T. C., M.D., F.A.C.S., F.I.C.S. (Hon.),** Atlanta
President, American Goiter Association; Chief, Surgical Service of Georgia Baptist Hospital; Surgical Consultant, Sheffield Cancer Clinic.
and
Letton, A. H., M.D., F.A.C.S., F.I.C.S., Atlanta
"Thyroiditis"

10:00-10:45 **Intermission to View Exhibits**

10:45-11:00 **Bartels, Elmer C., M.D., F.A.C.P.,** Boston
Department of Internal Medicine, Lahey Clinic, Boston.
"The Proper Pre-operative Use of Anti-Thyroid Drugs"

11:00-11:15 **Cattell, Richard B., M.D., F.A.C.S.,** Boston
Surgeon-in-Chief, New England Deaconess Hospital.
"Technic of Thyroidectomy"

11:15-11:30 **Lundy, John S., M.D., F.I.C.S. (Hon.),** Rochester, Minnesota
Chief, Section on Anesthesiology, Mayo Clinic; Professor of Anesthesiology, The Mayo Foundation for Medical Education and Research.
"The Problem of the Thyroid Gland from the Standpoint of the Anesthesiologist"

11:30-11:45 **Crile, George, Jr., M.D., F.A.C.S.,** Cleveland
Surgeon, Cleveland Clinic.
"The Present Status of the Treatment of Hyperthyroidism"

11:45-12:00 **Rawson, Rulon W., M.D.,** New York
Chief, Department of Clinical Investigation, Sloan-Kettering Institute; Associate Professor of Medicine, Cornell University Medical School; Attending Physician, Memorial Hospital, New York.
"Radioactive Iodine: Its Use in the Study and Treatment of Thyroid Neoplasms"

12:00-12:15 **Bartlett, Robert, W., M.D., F.A.C.S.,** St. Louis
Assistant Professor of Clinical Surgery, Washington University School of Medicine.
"Pitfalls in the Management of Nodular Goiter"

AFTERNOON SESSION

Presiding: Philip Thorek, M.D., F.A.C.S., F.I.C.S., Chicago

2:00- 2:20 **Wilkinson, R. J., M.D., F.A.C.S., F.I.C.S.,** Huntington, West Virginia
"Trichobezoar"

2:20- 2:40 **McGraw, Arthur B., M.D., F.A.C.S.,** Detroit

Senior Associate Surgeon, Henry Ford Hospital Detroit

"Surgical Aspects of Meckel's Diverticulum"

2.40- 3.00 **McGuire, Louis D., F.A.C.S., F.I.C.S., Omaha**

Associate Professor of Surgery Creighton University School of Medicine, Assistant Attending Surgeon, Creighton Memorial and St Joseph's Hospitals

"Surgical Management of Acute Cholecystitis"

3:00- 3:20 **Babcock, Wayne W., M.D., LL D., F.A.C.S., F.I.C.S., Philadelphia**

Emeritus Professor of Surgery Temple University Medical School

"Possible Fallacies in Biliary Surgery"

3:20- 3.40 **Nelson, M. Russell, M.D., F.A.C.S, F.I.C.S., New York**

Assistant Clinical Professor, Gynecology and Obstetrics New York Medical School and Flower Fifth Avenue Hospital

"Obstetrical Bleeding"

3.40- 4:10 **Intermission to View Exhibits**

4:10- 4:30 **Moon, Louis E., M.D., F.A.C.S, F.I.C.S., Omaha**

Associate Professor of Surgery and Head of Department of Proctology, Creighton University School of Medicine

"A Discussion of Anal, Rectal and Sigmoid Lesions Commonly Seen"

4:30- 4:50 **Best, R. Russell, M.D., F.A.C.S, Omaha**

Professor of Surgery University of Nebraska College of Medicine, Omaha

"Factors Related to Avoiding the Colostomy in Lesions of the Rectosigmoid"

EVENING SESSION

8.00- 9.00 **Panel Discussion with Morning Speakers**
Moderator Arnold S Jackson, M D., F A C S, F I C S, Madison, Wisconsin

9.00-10.00 **Panel Discussion with Afternoon Speakers**
Moderator Harry E Bacon, M D, F A C S, F I C S., Philadelphia

Thursday November 2, 1950

MORNING SESSION

Presiding Rudolph Nissen, M D, F I C S, New York

Secretary Paul F Doege, M D, F A C S, F.I C S, Marshfield, Wisconsin

9.00 9 20 **O Neill, J Norman, M.D, F.A.C.S. Los Angeles**

[illegible] Surgery University of Southern California Medical School Attending Surgeon Los Angeles County General Hospital

"A Critical Analysis of Fifty Diaphragmatic H[illegible] Hernias Repaired by the Abdominal [illegible] Transthoracic Approach

9.20- 9.40 **Beck, Claude S., M.D, F.A.C S, Cleveland**

Professor of Neurosurgery Western Reserve University Medical School, Chief Consultant, Neurosurgery, Crile Veterans Hospital, Visiting Neurosurgeon Cleveland City Hospital, Associate Surgeon, University Hospitals, Cleveland

"The Surgical Treatment of Coronary Disease"

9.40 10 00 **Thorek, Max, LLD., D.Sc., M D., F.I.C.S., F.B.C.S., Chicago**

Professor of Surgery Cook County Graduate School of Medicine Founder and Secretary General, International College of Surgeons, Formerly Attending Surgeon Cook County Hospital, Surgeon in Chief, American Hospital, Consulting Surgeon, Municipal Tuberculosis Sanitarium

"Impending Death Under Anesthesia"

10.00-10.30 **Intermission to View Exhibits**

10.30-10.50 **Ward, Grant E., M.D., D.Sc., F.A.C.S, Baltimore**

Associate Professor of Surgery, Johns Hopkins University School of Medicine Associate Professor of Surgery, University of Maryland School of Medicine, Associate Professor of Oral Surgery and Special Lecturer School of Dentistry, University of Maryland, Visiting Surgeon, Johns Hopkins Hospital, Surgeon in Charge Tumor Clinic, Johns Hopkins Hospital and University of Maryland Hospital

and

Hendrick, James W., M.D., F.R.C S., F.I.C.S., San Antonio, Texas

"Tumors of the Jaws"

10:50-11:10 **Kinsella, Thomas J., M.D., F.A.C.S., Minneapolis**

Clinical Professor of Surgery, University of Minnesota Medical School Senior Consultant in Thoracic Surgery, U S Veterans Bureau Facility, Fort Snelling

"Some Simple Thoracic Emergencies"

11:10-11:30 **Zieman, Stephen A., M.D., F.A.C S, F.I.C.S, Mobile, Alabama**

"Re-establishing Lymph Drainage in Lymphedema of the Extremities"

11.30 11.50 **Stuck, Ralph, M.D., F.I.C.S., Denver**

Assistant in Neurosurgery University of Colorado Medical School, Neurosurgeon, St Joseph St Anthony Mercy, Presbyterian, St Luke's, Rose Memorial, Denver General and Colorado General Hospitals Denver

"Subdural Hematoma in Infants" (Motion Picture)

AFTERNOON SESSION

Presiding William C MacCarty, Sr, M D, F A C S, F I C S (Hon), Rochester, Minnesota

Secretary George C Shivers, M D, F A C S, F I C S Colorado Springs

2.00- 2:20 **Harrington, Stuart W., M D., F.A C.S, Rochester, Minnesota**

Chief, Section of Thoracic and General Surgery *Mayo Clinic* Professor of Surgery University of Minnesota Mayo Foundation Rochester

"Surgical Treatment of Bilateral Carcinoma of the Breast"

2.20- 2 40 **Nicolson, William P., Jr., M.D., F.A.C.S., F.I.C.S, Atlanta**

"Human Proof of Animal Experiment as One of the Causes of Cancer of the Breast"

2:40- 3:00 **Munro, Donald, M.D., F.A.C.S.,** Boston

Surgeon-in-Chief, Department of Neurosurgery, *Boston City Hospital; Assistant Professor of* Neurosurgery, Harvard Medical School; Associate Professor of Neurosurgery, Boston University Medical School.

"Herniation of the Temporal Cortex through the Incisura Tentorii"

3:00- 3:20 **Marks, Mark M., M.D., F.I.C.S.,** Kansas City, Missouri

Chief, Section on Proctology, Department of Surgery at Menorah Hospital and Alfred Benjamin Dispensary.

"Barium Modification with Methocel in the Diagnosis of Bowel Lesions"

3:20- 3:40 **Douglas, Gilbert F., M.D., F.A.C.S., F.I.C.S.,** Birmingham, Alabama

Associate Professor of Gynecology, Medical College of Alabama; Chairman of the Board of Regents, United States Chapter, International College of Surgeons.

"Ectopic Pregnancy"

3:40- 4:10 **Intermission to View Exhibits**

4:10- 4:30 **Acuff, Herbert, M.D., F.A.C.S., F.I.C.S.,** Knoxville, Tennessee

Chief of Staff, St. Mary's Memorial Hospital; President-Elect, International College of Surgeons.

"Surgical Management of Conditions and Diseases Affecting the Liver"

4:30- 4:50 **Thiessen, Norman W., M.D., F.A.C.S.,** Cleveland

Chief of Surgery, Lakewood City Hospital; Clinical Instructor in Surgery and Anatomy, Western Reserve University Medical School; Consultant in Surgery, Crile Veterans Administration Hospital.

"The Education of the Biliary Surgeon"

Thursday Evening

Banquet

Grand Ballroom, Statler Hotel, Cleveland
7:30 P.M.

Custis Lee Hall, M.D., F.A.C.S., F.I.C.S., Washington, D. C., *Presiding*

Clinical Professor of Surgery, George Washington Medical School; Chief, Department of Orthopedics, Doctors Hospital; Consultant in Orthopedic Surgery, Naval Medical Center.

SPEAKER:
Frank Lahey, M.D., F.A.C.S., Boston
"Some of the Recent Advances in Surgery"

Friday, November 3, 1950

MORNING SESSION

Presiding: William R. Lovelace, M.D., F.I.C.S., Albuquerque, New Mexico

Secretary: George Ferre, M.D., F.I.C.S., Miami, Florida

9:00- 9:20 **Hendrick, James W., M.D., F.R.C.S., F.I.C.S.,** San Antonio, Texas

and

Ward, Grant E., M.D., F.A.C.S., Baltimore

Associate Professor of Surgery, The Johns Hopkins Hospital.

"Treatment of Carcinoma of the Lip"

9:20- 9:40 **Scott, Michael, M.D., F.A.C.S., F.I.C.S.,** Philadelphia

Associate Professor of Neurosurgery and Chief of Department, Temple University Hospital and Medical School; Attending Neurosurgeon, Jewish Hospital, The Philadelphia General Hospital and St. Christophers Hospital for Children.

and

Wycis, Henry T., M.D., F.A.C.S., Philadelphia

Assistant Professor of Neurosurgery, Temple University Hospital and Medical School.

"Stainless Steel Cranioplasty"

9:40-10:00 **Wright, Herbert B., M.D., F.A.C.S.,** Cleveland

Chief of Surgery, St. Vincent's Hospital, Cleveland; Chief of Urology, Deaconess Hospital; President, Cleveland Academy of Medicine.

"Ureteral Abnormalities as Related to General Surgery"

10:00-10:40 **Intermission to View Exhibits**

10:40-11:00 **Bendandi, Giuseppe, M.D., F.I.C.S.,** Rome, Italy

Associate Professor of Surgery, Surgical Clinic, University of Rome.

"Modern View of the Surgical Therapy of Pulmonary Echinococcus Cyst"

11:00-11:20 **Cruthirds, Archie E., M.D., F.A.C.S., F.I.C.S.,** Phoenix, Arizona

"A New Approach to the Healing of Burns by the Use of Sulfhydryl"

11:20-11:40 **Jackson, James A., M.D., F.A.C.S.,** Madison, Wisconsin

Chief of Staff, Methodist Hospital, and Co-Chief, Jackson Clinic.

and

Steeper, John R., M.D., Madison, Wisconsin

"Operative Excision of Giant Panniculus Adiposus" (Motion Picture)

11:40-12:00 **Fahrni, Gordon S., M.D., Ch.M., F.R.C.S. (C), F.A.C.S., F.I.C.S. (Hon.),** Winnipeg, Canada

Assistant Professor of Surgery, University of Manitoba Medical School; Assistant Surgeon, Winnipeg General Hospital; Honorary Attending Surgeon, King George and King Edward Hospitals.

"Factors Predisposing to Minimal Reaction to Surgical Operations"

AFTERNOON SESSION

Presiding: Gilbert F. Douglas, M.D., F.A.C.S., F.I.C.S., Birmingham, Alabama

Secretary: J. Harry Hayes, M.D., F.A.C.S., F.I.C.S., Little Rock

2:00- 2:20 **Fay, Temple, M.D., F.A.C.S., F.I.C.S.,** Philadelphia

Professor of Neurosurgery, Women's Medical College of Pennsylvania; Chief, Neurosurgery, Neurophysical Rehabilitation Clinic; Active Consulting Neurosurgeon, Philadelphia General Hospital.

"The Treatment of High Cervical Lesion Complicated by Bulbar Paralysis"

2:20- 2:40 **Jackson, Dudley, Sr., D.V.M., M.D., F.A.C.S.,** San Antonio

Associate Professor of Surgery Baylor Post Graduate Medical School

"A Study of Breast Secretion for the Detection of Intramammary Pathology and the Detection of the Silent Papilloma"

2:40- 3:10 Intermission to View Exhibits

3:10- 3:30 **Stein, Justin J., M.D., F.A.C.S., F.I.C.S.,** Los Angeles

Assistant Clinical Professor of Surgery College of Medical Evangelists Los Angeles, Tumor Surgeon, Los Angeles Tumor Institute

"Treatment of Breast Cancer Surgery and Irradiation Therapy Discussed in Detail with Five-Year Results in a Large Series of Cases"

3:30- 3:50 ***Shelden, C. Hunter, M.D., M.S., F.A.C.S.,*** Pasadena, California

Neurosurgeon, Huntington Memorial Hospital Pasadena, Neurosurgeon, St Vincent's Hospital Los Angeles

"Surgical Management of Intracranial Arteriovenous Aneurysms"

3:50- 4:10 **Behrend, Moses, M.D., F.A.C.S., F.I.C.S ,** Philadelphia

Consulting Surgeon to Jewish and Mount Sinai Hospitals, Thoracic Surgeon to St Agnes Hospital, Associate in Surgery, Jefferson Medical College

and

Behrend, Albert, M.D., F.A.C.S., F.I.C.S.,
Waldo, Irving, M.D.,
Brylawski, Michael, M.D.,
Philadelphia

"Thrombocytopenia Purpura, Report of 53 Cases"

4:10- 4:30 **Montenegro, Benedicto, M.D., F.A.C.S.,** Sao Paulo, Brazil

"Surgery of Peptic Ulcer"

4:30- 4:50 **Cutler, Max, M.D., F.I.C.S.,** Chicago

Director, Chicago Tumor Institute

"The Problem of 'Bleeding Nipple' "

Friday Evening

Convocation

Music Hall, Cleveland Public Auditorium

Custis Lee Hall, M D, F A C S, F I C S, *Presiding*
Francis D Wolfe, M D, F A C S, F I C S, *Convocation Chairman*
Ernest F Purcell, M D, F I C S, *Director of Pageant*
Claire E Carr, M D, F I C S, *Director of Music*
Frank H Murray, M D, F A C S, F I C S, *Registration of Inductees*

Installation of Officers and Induction of New Fellows and Associate Fellows

Elmer L Henderson M D, F A C S, F I C S (Hon)
President, American Medical Association

"The Importance of International Cooperation in Surgery."

Urology Section

Public Auditorium, Club Room C

Wednesday, November 1, 1950

Presiding George H Ewell, M D, F I C S, Madison, Wisconsin
Secretary Cyril K Church, M D, F I C S, New York

9:00- 9:30 **Thompson, Gershom J., M.D., F.A.C.S., F.I.C.S. (Hon.),** Rochester, Minnesota

Professor of Urology Mayo Foundation Head of Section on Urology Mayo Clinic

and

Counsellor, Virgil S., M.D., F.A.C.S., Rochester, Minnesota

Professor of Surgery, Minnesota Graduate School

"Uretovaginal Fistula"

9:30-10:00 **Slotkin, George E., M.D., F.A.C.S.,** Buffalo, New York

Associate Professor of Urology University of Buffalo Medical School, Chief of Service E J Meyer Memorial Hospital and Millard Fillmore Hospital

"Urinary Tuberculosis Present Non-Surgical Treatment"

10:00-10:30 **Lowsley, Oswald S., M.D., F.A.C.S., F.I.C.S.,** New York

President and Director, Oswald Swinney Lowsley Foundation Inc , St Clare's Hospital, Consulting Urologist to the Medical Corps United States Navy

"Crossed Ectopic Testis"

10:30-11:15 Intermission to View Exhibits

11:15-11:45 **Brodny, M. Leopold, M.D., F.A.C.S., F.I.C.S.,** Boston

Assistant Professor, Radiology, Tufts College Medical School

"*Etiology of Strictures After Prostatic Surgery*"

11:45-12:15 **Carruthers, C.M., M.D., F.R.C.S. (Eng.), F.R.C.S., (Can.), F.A.C.S., F.I.C.S.,** Sarnia, Ontario, Canada

"Retropubic Prostatectomy"

Orthopedic Section

Public Auditorium, Club Room C

Wednesday, November 1, 1950

Presiding Henry W Meyerding, M D., F A C S, F.I C S, Rochester, Minnesota
Secretary Eugene L Jewett, M D, F A C S, F I C S, Orlando, Florida

2.00- 2:20 **Virgin, Herbert W., Jr., M.D., F.A.C.S., F.I.C.S.,** Miami, Florida

Chief, Orthopedic Surgery Mt Sinai Hospital, Orthopedic Surgeon, St Francis Hospital Miami Beach Doctors' Hospital and Variety Children's Hospital, Coral Gables

"*Clinical Review of Four Hundred Knee Injuries*"

2:30- 3.00 **Garceau, George J., M.D., F.I.C.S.,** Indianapolis

Professor of Orthopedic Surgery, Indiana University Medical School,

and

Sigmund, Harvey, M.D.,
Indianapolis

"Impacted Fractures of the Anatomical Neck of the Femur"

3:00- 3:30 **McBride, Earl D., M.D., F.A.C.S., F.I.C.S.,** Oklahoma City, Oklahoma

Clinical Professor, Orthopedic Surgery, Oklahoma University School of Medicine; Chief Surgeon, Bone and Joint Hospital, and McBride Clinic, Oklahoma City.

"A Metallic Femoral Head Prosthesis for the Hip Joint"

3:30- 4:00 **Intermission to View Exhibits**

4:00- 4:30 **Lewin, Philip, M.D., F.A.C.S., F.I.C.S.,** Chicago

Professor, Bone and Joint Surgery, Northwestern Medical School; Professor, Orthopedic Surgery, Cook County Graduate School of Medicine.

"Low Back Pain and the Disk Syndromes"

4:30- 5:00 **Street, Dana M., M.D.,**
Memphis, Tennessee

Chief, Orthopedic Section, Kennedy Veterans Administration Hospital, Memphis.

"Medullary Nailing in Femur Shortening for Equalization of Leg Length"

Eye, Ear, Nose and Throat Section

All Section Meetings will be held in the Cleveland Public Auditorium, Club Room A

Wednesday, November 1, 1950

MORNING SESSION—OPHTHAMOLOGY

Presiding: Richard A. Perritt, M.D., F.A.C.S., F.I.C.S., Chicago, Illinois

Secretary: Paul C. Craig, M.D., F.A.C.S., F.I.C.S., Reading, Pennsylvania

10:00-10:30 **Harvey E. Thorpe, M.D.**
Pittsburgh

Chief, Department of Ophthalmology, Montefiore Hospital.

"Scleral Resection for the Treatment of Retinal Separation"

10:40-11:10 **John S. McGavic, M.D.,**
Bryn Mawr, Pennsylvania

Associate Professor of Ophthalmology, Temple University.

"Complications in Cataract Surgery"

11:10-11:20 **Intermission to View Exhibits**

11:20-12:20 **William A. Mann, M.D.,**
Chicago

Professor of Ophthalmology, Northwestern University Medical School.

"Care of the Aphakic Patient" (Slides)

12:30 **Luncheon**

Presiding: Richard A. Perritt, M.D., F.A.C.S., F.I.C.S., Chicago

Round Table Discussion:
"Care of the Aphakic Patient"

Participants:
William A. Mann, M.D., Chicago,
Oscar B. Nugent, M.D., F.A.C.S., F.I.C.S., Chicago
Otis B. Wolfe, M.D., Marshalltown, Iowa
David J. Edwards, M.D., Chicago
"Optician's Viewpoint"

AFTERNOON SESSION—OTOLARYNGOLOGY

Presiding: Chevalier L. Jackson, M.D., F.A.C.S., F.I.C.S., Philadelphia

Secretary: Matthew S. Ersner, M.D., F.A.C.S., F.I.C.S., Philadelphia

2:00- 2:20 **George B. Trible, M.D., F.A.C.S., F.I.C.S.,** Washington, D. C.

"Present Conceptions of Non-suppurative Labyrinthitis"

2:30- 2:50 **Samuel F. Kelley, M.D., F.A.C.S., F.I.C.S.,** New York

"Otorhinologic Surgical Problems in the Biochemical Era"

3:00- 3:20 **Juan Manuel Tato, M.D.,**
Buenos Aires, Argentina

"Surgical Treatment of Chronic Frontal Sinusitis"

3:30- 3:50 **Gerson Lowenthal, M.D., F.I.C.S.,**
Cincinnati, Ohio

Instructor in Otolaryngology, University of Cincinnati.

"Fractures of the Face"

3:50- 4:30 **Intermission to View Exhibits**

Thursday, November 2, 1950

MORNING SESSION—OPHTHALMOLOGY

Presiding: Clarence Albaugh, M.D., F.I.C.S., Los Angeles

10:00-10:30 **Richard A. Perritt, M.D., F.A.C.S., F.I.C.S.,** Chicago

"Technique of Complete Superficial Keratectomy"

(Preliminary remarks and 16 mm. Kodachrome film)

10:30-11:30 **Study Club: "Tropia Problems"**

Moderator: Paul C. Craig, M.D., F.A.C.S., F.I.C.S., Reading, Pennsylvania

Edmund B. Spaeth, M.D., F.A.C.S., F.I.C.S.

Professor at Ophthalmology Graduate School, University of Pennsylvania, Philadelphia; Attending Surgeon, Will's Eye Hospital.

11:30-12:30 **Business Meeting**

Presiding: Chevalier L. Jackson, M.D., F.A.C.S., F.I.C.S., Philadelphia

12:30 **Luncheon**

Presiding: Chevalier L. Jackson, M.D., F.A.C.S., F.I.C.S., Philadelphia

Speaker: **John E. L. Keyes, M.D., F.A.C.S., Cleveland**

"Some of the Causes of Failure in Glaucoma Surgery"

AFTERNOON SESSION—OTORHINOLARYNGOLOGY

Presiding: Matthew S. Ersner, M.D., F.A.C.S., F.I.C.S., Philadelphia

00 2 20 **Bernard J Ronis, M D , F I C S ,**
Philadelphia
Assistant Professor of Otorhinology Temple University School of Medicine
Present Day Indications and Contraindications for Fenestration Operation for Otosclerosis
(Motion Picture Demonstration)

30 2 50 **John V Blady, M D , F I C S ,**
Bryn Mawr, Pennsylvania
Associate Professor of Surgery (Oncology) Temple University School of Medicine
Carcinoma of the Nose and Paranasal Sinuses

3 00 3 20 **Raymond S Rosedale, M.D , F I C S ,**
Canton, Ohio
Senior Staff Mercy and Little Flower Hospitals
Bronchoscopy in the Newborn—The Otolaryngologists Contribution to Obstetrics

3 30 3 50 **E Markey Pullen, M D , F I C S ,**
New York
Attending Otolaryngologist St Clares Hospital
The Submucous Resection

3 50 4 30 **Intermission to View Exhibits**

Assembly Information

Hotel Reservations—See back cover
Registration, Monday 2 00 p m through Friday
00 p m October 30 November 3 Cleveland Public
uditorium, Cleveland Ohio

Advance registration (on Monday) will save your time

- Admission by badge only to all scientific Assemblies, section meetings, and to the exhibits Present your I C of S membership card to expedite registration Registration fee $5 00

Bona fide doctors of medicine serving as residents and interns, if vouched for by written card or letter by the superintendent of their hospital or by an officer of the College, will be registered as guests Please present credentials at Registration Desk

- Information of practical value in every day surgical practice will be obtained at the 1950 International College of Surgeons Assembly

- Papers Will Begin and End on Time

- Banquet—Grand Ballroom, Statler Hotel Cleveland, Thursday November 2 The social highpoint of the Assembly

- Convocation—Friday, November 3 in Music Hall of Cleveland Public Auditorium A colorful pageant symbolizing the international aspects of the College Tickets available at Registration Desk for I C of S members all registrants, their families and guests (no admission fee)

- One hundred twenty seven technical exhibits will open daily at 8 30 a m and close at 5 30 p m Frequent intermissions to view the exhibits have been arranged before during and after the assemblies

Please Register at Every Booth

Scientific Motion Picture Program

Philip Thorek, M D , F I C S , F A C S , Chairman

Tuesday, Wednesday, Thursday and Friday

October 31, November 1, 2 and 3, 1950

The motion picture theater will be in continuous operation from 10 00 a m to 12 noon and 2 00 p m to 5 00 p m Tuesday through Friday Each film will be shown twice during this period on a definite schedule Films have been grouped according to subject matter

Head Section

Tuesday and Thursday, 10 00 a m

Corneal Transplant

Charles I Thomas Western Reserve University School of Medicine Cleveland

This film shows the surgical technic of a partial penetrating corneal transplant using the round graft technic Silent 22 minutes

Tuesday and Thursday 10 22 a m

Subdural Hematoma in Infants

Ralph M [illegible] of Colorado School of Medicine, Denver

The clinical picture of subdural hematoma in infants is explained. The diagnosis is confirmed by aspiration of the fontanelles. The lesion is treated surgically by complete removal of the cystic subdural membrane. Silent; 17 minutes.

Tuesday and Thursday, 10:39 a.m.

Transorbital Lobotomy

Walter Freeman, George Washington University School of Medicine, Washington, D. C.

Transorbital lobotomy is a modification of the recognized technic for prefrontal lobotomy. This new procedure is accomplished by approaching the frontal radiations via the roof of the eye socket. A bilateral operation employing electroshock anesthesia is shown in full detail. Sound; 12 minutes.

Neck Section

Tuesday and Thursday, 10:51 a.m.

Excision of Branchial Fistula and Cyst

Conrad J. Baumgartner, College of Medical Evangelists, Los Angeles

The operation for the removal of a branchial fistula, using a stepladder incision and carrying dissection to the lateral wall of the pharynx is depicted. This operation is followed by another for the excision of a branchial cyst. A horizontal incision is made through the skin and the cyst is excised through a further incision. Silent: 22 minutes.

Tuesday and Thursday, 11:13 a.m.

Subtotal Thyroidectomy

James R. Johnson, Los Angeles County Harbor General Hospital, Los Angeles

The essential steps in performing a subtotal thyroidectomy are shown on a patient with a large adenomatous goiter. Division of the pretracheal muscles, identification of the parathyroid glands, all of the thyroid vessels, and the recurrent laryngeal nerve are demonstrated. Silent; 12 minutes.

Heart Surgery

Tuesday and Thursday, 11:25 a.m.

Defibrillation of the Heart

Claude S. Beck, Western Reserve University School of Medicine, Cleveland

The value of this procedure as an emergency measure is discussed. The defibrillating machine and its use are demonstrated. Postoperative results are depicted and discussed. Silent; 11 minutes.

Tuesday and Thursday, 11:36 a.m.

Surgical Treatment for Patent Ductus Arteriosus

George H. Humphreys II, College of Physicians and Surgeons, New York

A 3½-year-old girl with a patent ductus arteriosus is examined, and the effects of the condition are demonstrated. The typical "coffee-mill" murmur is heard on the sound track, and the roentgenogram shows the characteristic changes in the outline of the heart. The surgical approach is made through the anterolateral chest wall at the level of the second interspace. The anatomy of the region around the ductus is demonstrated. The ductus is ligated at each end, doubly clamped and divided. Postoperative views amplify the film. Sound; 13 minutes.

Cancer Series

Tuesday and Thursday, 1:00 p.m.

Films to be introduced by Dr. Brewster S. Miller, Assistant Director, Professional Education Section, American Cancer Society, Inc.

Gastrointestinal Cancer

American Cancer Society, Inc., New York, and National Cancer Institute, United States Public Health Service, Bethesda, Maryland.

This is the third in a series of teaching films dealing with the problem of the early diagnosis of carcinoma. Its importance can be stressed by the fact that gastrointestinal carcinoma accounts for one-fourth of all cancer cases and causes more than one-half of all cancer deaths. Diagnostic methods and criteria are shown in detail. Sound; 30 minutes.

Tuesday and Thursday, 1:45 p.m.

Self-Examination of the Breast

American Cancer Society, Inc., New York, and National Cancer Institute, United States Public Health Service, Bethesda, Maryland.

The film shows how the woman can be taught the simple technic of breast self-examination, by which method she, herself, may discover a tumor frequently as small as half an inch in diameter. It also teaches her the urgency of reporting any breast lump immediately to her physician. Sound; 15 minutes.

Thoracic Surgery

Tuesday and Thursday, 2:00 p.m.

Esophagogastrostomy for Achalasia of the Esophagus

John L. Madden, Long Island College of Medicine, Brooklyn

This film depicts in detail the technic of lateral anastomosis between the esophagus and the fundus of the stomach, proximal to the obstruction at the cardia. Sound; 30 minutes

Tuesday and Thursday, 2:30 p.m.

Management and Technic of Pulmonary Lobectomy

Department of the Army, Office of the Surgeon General, Washington, D. C.

The case of a 28-year-old man who has clinical manifestations and bronchogram confirmations of bronchiectasis of the left lower lobe of the lungs. A detailed presentation is given of the extirpation of the diseased lung tissue which offered the only cure Sound, 27 minutes.

Tuesday and Thursday, 2:57 p.m.

Transthoracic Repair of a Diaphragmatic Hiatus Hernia

J. Norman O'Neill, University of Southern California School of Medicine, Los Angeles

This film demonstrates the technic of removing fascia lata and its utilization in insuring permanency of the repair. The regional anatomy and surgical technic are depicted. Silent; 12 minutes.

Tuesday and Thursday, 3:09 p.m.

Pulmonary Arteriovenous Fistula

Albert Behrend, Temple University School of Medicine, Philadelphia

This film depicts the symptoms and signs as well as the roentgen findings in a pulmonary arteriovenous fistula. Lobectomies performed on both left and right sides are demonstrated. Silent; 19 minutes.

Abdominal Surgery

Tuesday and Thursday, 3:28 p.m.

Subtotal Gastrectomy

Philip Thorek, University of Illinois College of Medicine, Chicago

A subtotal gastric resection with closure of the duodenal end and a retrocolic end to side gastrojejunostomy is presented. The operation is performed for a prepyloric carcinoma of the stomach. The surgical steps are shown in detail and the surgical anatomy is stressed. The film is amplified by colored illustrations, roentgenograms and microphotography. Silent; 45 minutes.

Tuesday and Thursday, 4:13 p.m.

Surgery of the Biliary Tract

Arnold Jackson, Jackson Clinic, Madison, Wisconsin

The technic employed in performing surgery of the biliary tract is demonstrated. A cholecystectomy is depicted as well as the technic used in removing common duct stones and the use of the T tube. Silent; 12 minutes.

Tuesday and Thursday, 4:25 p.m.

Intrahepatic Cholangiojejunostomy with Partial Hepatectomy for Biliary Obstruction

Kenneth C. Sawyer, University of Colorado School of Medicine, Denver

The film demonstrates a method of treating extensive obstruction of the common hepatic duct by anastomosing one of the intrahepatic biliary ducts to the jejunum following partial resection of the left lobe of the liver. Silent; 18 minutes.

Wednesday and Friday, 10:00 a.m.

Splenectomy for Splenomegaly

Raymond McNealy, Northwestern University Medical School, Chicago

This [illegible] ic of splenectomy utilizing a left subcostal incision. T[illegible] and demonstration of an accessory spleen are depicted. Silent; 12 minutes.

Wednesday and Friday, 10:12 a.m.

The Surgical Treatment of Hirschsprung's Disease

Robert B. Hiatt, Columbia-Presbyterian Medical Center, New York

A brief explanation of the syndrome by diagram and roentgenogram is followed by the operation. First, through an abdominal incision the peritoneum is opened, and the lower achalasic portion of the sigmoid is mobilized. A clamp is then inserted into the rectum from below, closed around a knuckle of the intestine and the rectum everted. After the abdomen is closed, the everted rectum and achalasic portion of sigmoid are excised, and the mucosa of the remaining sigmoid sutured to that of the anus. The sphincter mechanism remains intact, and bowel movements return to normal postoperatively. Sound; 17 minutes.

Gynecology

Wednesday and Friday, 10:29 a.m.

Technic of Vaginal Hysterectomy

Virgil S. Counseller, Mayo Clinic, Rochester, Minnesota

The technic shown in the film is applicable in all conditions requiring vaginal hysterectomy. Vaginal plastic repair is done following the removal of the uterus when repair is indicated. Silent; 18 minutes.

Wednesday and Friday, 10:47 a.m.

Total Abdominal Hysterectomy

Deward O. Ferris, Mayo Clinic, Rochester, Minnesota

The pathologic condition in this case is a large cervical fibroid necessitating more dissection than is usually necessary for total hysterectomy. The film clearly shows the safeguards used in protecting the bladder and ureters during the complete operation. It also demonstrates [illegible] construction of the pelvic floor and ligaments. Silent; 19 minutes.

Genitourinary Surgery

Wednesday and Friday, [illegible]1:06 a.m.

Transperitoneal Nephrectomy (Transverse Abdominal Incision)

Charles W. [illegible] of Southern California School of Medicine, Los Angeles

The film demonstrates the [illegible] transverse abdominal incision for [illegible] to the removal of large renal tumors [illegible] the renal [illegible] from the front [illegible] unlimited working space with the [illegible] of the [illegible]. The approach gives excellent results when [illegible] is necessary. Silent; [illegible] minutes.

Wednesday and Friday, 11.22 a.m.

Subdiaphragmatic Renal Exposure by Eleventh Rib Resection

Henry Bodner, College of Medical Evangelists, Los Angeles

Renal exposure by removal of the eleventh rib and then a stepdown continuation of the incision along the upper border of the twelfth rib allows excellent exposure of the very large kidneys. The incision is made slightly more anterior than the usual subcostal. The adrenals and spleen are also readily exposed by this route. This exposure also allows the renal pedicle to be approached directly. Silent, 12 minutes.

Wednesday and Friday, 11:34 a.m.

Tumor of the Testicle

James C. Sargent, Marquette University School of Medicine, Milwaukee

This film presents several major clinical types of testicular tumors with comment on those most malignant and least radiosensitive, for which radical regional gland dissection seems indicated. The operation of orchiectomy with radical gland dissection is shown. Sound; 21 minutes.

Proctology

Wednesday and Friday, 2:00 p.m.

Transcolonic Removal of Benign Adenomatous Polyp

Harry E. Bacon, Temple University School of Medicine, Philadelphia

The film shows the technic of transcolonic removal of benign adenomatous polyps based on 56 cases. The methods of diagnosis and the technic of sigmoidotomy are depicted. Silent; 12 minutes.

Wednesday and Friday, 2:12 p.m.

Proctoplasty in Hemorrhoidectomy

A. Gerson Carmel, University of Cincinnati College of Medicine, Cincinnati

The removal of large segments of hemorrhoidal tissues, while frequently necessary, is prone to be followed by stenosis and seepage. These sequelae are preventable by employing plastic procedures which include whole thickness sliding grafts and the suturing of partially detached cut skin edges to the superior portion of the muscular anorectal ring and mucous membrane. Silent; 13 minutes.

Vascular Surgery

Wednesday and Friday, 2:25 p.m.

Arteriovenous Fistula with False Sac—Lower Femoral Vessels

(Quadruple Ligation and Excision)

Department of the Army, Office of the Surgeon General, Washington, D. C.

The essential phases of diagnosis and the best conditions under which the preoperative studies may be accomplished are demonstrated and portrayed. Details of surgical procedure and reasons therefore are shown. Sound; 16 minutes.

Wednesday and Friday, 2.41 p m.

Varicose Veins, Using a New Type of Stripper

Earl A Connolly, Creighton University School of Medicine, Omaha

The anatomy and technic of the "vein stripping" operation is shown The armamentarium is presented in detail Postoperative results are evaluated, and illustrations amplify the discussion Silent, 29 minutes

Wednesday and Friday, 3 10 p m.

Thrombosis and Embolism

Norman P Schenker, Cantonal Hospital, Geneva, Switzerland

This film presents the subject of thromboembolism, utilizing microphotography The formation of a thrombus as well as its detachment are clearly demonstrated English narration clearly describes the interesting story of clot formation and embolus migration Sound, 20 minutes

Orthopedics

Wednesday and Friday, 3 30 p m

Cineplastic Operation

Department of the Army, Office of the Surgeon General, Washington, D C

Shows a cineplastic operation Cords are attached to muscle and then to a prosthetic appliance so that the patient can operate the prosthetic appliance by contracting his own muscles in the amputation stub Sound, 16 minutes

Wednesday and Friday, 3 46 p m

The Bone Bank

Philip D Wilson, Hospital for Special Surgery, New York

This film is designed to illustrate how a bone bank for refrigerated, homogenous bone is organized and employed The usual sites from which bone is obtained for this purpose and the method of storing it in a deep freeze unit are shown Typical orthopedic operations in which it is used are briefly illustrated Roentgenograms and microscopic studies based on experimental data show how well such bone is assimilated into the body The many advantages to an orthopedic service or hospital of using such refrigerated homogenous bone are summarized Sound, 28 minutes

Wednesday and Friday, 4 14 p m

Surgical Approaches to the Scapulohumeral Joint

Leroy C Abbott Veterans Administration and University of California School of Medicine San Francisco

The film shows the anatomy of the scapulohumeral joint with animation Surgical approaches for repair in recurrent dislocation, arthrodesis of the shoulder and the removal of deposits are presented Sound 30 minutes

Television Program
Fifteenth Annual Assembly, United States Chapter

General Chairman: T. S. Gerspacher, M.D., F.A.C.S., F.I.C.S.
Co-Chairman: Carl Rotter, M.D., F.I.C.S.
Clarence W. Engler, F.A.C.S., Chief of Staff
Herbert Wright, M.D., F.A.C.S., Director of Surgery
Donald Darrah, M.D., F.A.C.S., Coordinator and Chairman of Television Program

At its Fifteenth Annual Assembly the International College of Surgeons will present a three-day program of surgical operations in color television. The program will be sponsored and directed by the Smith, Kline and French Laboratories through the courtesy and cooperation of the staff of St. Vincent Charity Hospital, Cleveland. Specific arrangements will be handled by the Television Committee of the International Congress. The program will be transmitted from 9 a.m. to 10 p.m. on November 1, 2 and 3.

Special color television receivers will be installed in the Cleveland Public Auditorium, enabling up to 1.000 surgeons to watch the operations simultaneously with their actual performance at St. Vincent Charity Hospital. Each surgeon will broadcast a commentary by means of a small microphone in his mask.

November 1

1. *Dr. Earle B. Kay, Institute of Thoracic Surgery, Western Reserve University; Visiting Thoracic Surgeon, City Hospital; Staff Associate, St. Vincent Charity Hospital*

   Transthoracic Repair
   Diaphragmatic Hernia

2. *Dr. H. H. Wyand, Head of Ophthalmologic Department, St. Vincent Charity Hospital*

   Combined Extracapsular Cataract
   Extracapsular Cataract

3. *Dr. Paul A. Milcarek, Visiting Surgeon, St. Vincent Charity Hospital*

   Surgery of Varicose Veins

4. *Dr. Clifford L. Kiehn, St. Vincent Charity Hospital*

   Plastic Surgery of Burns

5. *Dr. Frank Weinman, Visiting Proctologist, St. Vincent Charity Hospital*

   Hemorrhoidectomy

6. *Dr. O. E. Weber, Chief of Staff, Evangelical Deaconess Hospital; Visiting Surgeon, St. Vincent Charity Hospital*

   Cholecystectomy

7. *Dr. Herbert S. Wright, Director of Surgery, St. Vincent Charity Hospital; Chief Urologist, Evangelical Deaconess Hospital; Consulting Urologist, U.S. Army Air Force*

   Nephrectomy

November 2

1 *Dr W H Odell, Assistant Visiting Surgeon, St Vincent Charity Hospital*
  Open Reduction of Fracture of Femur

2 *Dr Henry A Zimmerman, Director of Cardiovascular Departments, City Hospital and St Vincent Charity Hospital*
  Intracardiac Catheterization

3 *Dr Spencer Braden, St Vincent Charity Hospital*
  Removal of Herniated Intravertebral Disk

4 *Dr Frank Vecchio Junior Assistant Visiting Surgeon, St Vincent Charity Hospital, Instructor in Anatomy, Western Reserve University*
  Thyroidectomy

November 3

1 *Dr. Donald Darrah, Clinical Instructor in Surgery, Western Reserve University, Associate Visiting Surgeon, Lakewood Hospital, Senior Assistant Visiting Surgeon, St Vincent Charity Hospital*
  Inguinal Herniorrhaphy

2 *Dr C Glenn Barber, Senior Clinical Instructor, Western Reserve University, Orthopedic Surgeon, St Vincent Charity Hospital*
  Synovectomy of Knee

3 *Dr O A Weber Chief of Staff, Evangelical Deaconess Hospital, Visiting Surgeon, St Vincent Charity Hospital*
  Radical Breast Amputation

4 *Dr H H Wyand, Head of the Ophthalmologic Department, St Vincent Charity Hospital*
  Recession of the Internal Rectus Muscle of the Eye
  Combined Extracapsular Cataract

5 *Dr Darrel T Shaw, Clinical Instructor in Plastic Surgery, Western Reserve University, Consultant at Marine Hospital and Crile Veterans Hospital*
  Surgery of the Hand

6 *Dr E P Neary, Assistant Professor of Clinical Surgery, Western Reserve University*
  Vaginal Hysterectomy

Dr Earle B Kay Institute of Thoracic Surgery, Western Reserve University, Visiting Thoracic Surgeon, City Hospital, Staff Associate, St Vincent Charity Hospital
  Transthoracic Gastrectomy

Victor D Ippolito, Junior Staff Member, St Vincent Charity Hospital; [illegible] Surgeon, Mary Mount Hospital
  Total Hysterectomy

[illegible] Neary Assistant Professor of Clinical Surgery, Western Reserve
[illegible]
  Gastric Resection

New Books

Intestinal Intubation. By Meyer O. Cantor. Springfield, Ill.: Charles C Thomas, Publisher, 1949. Publisher, 1949. Pp. 333, with 147 illustrations.

Intestinal intubation, that invaluable aid in the treatment of conditions involving distention of the bowel, is here explored in all its ramifications. Dr. Cantor has collected extensive historical, experimental and pragmatic data on the subject and has integrated it into a highly interesting presentation. The remarkable improvement in both tubes and technic during the decade just past is emphasized, as is the fact that a thorough knowledge of the method is essential to its effective use.

The book opens with a discussion of the history of the procedure and the invention of the various tubes and kindred devices. The anatomy of the gastrointestinal tract is reviewed, and the physiology of the intestine as related to intubation is discussed. The special problems associated with distention and decompression are examined. An entire chapter is devoted to description of the different tubes available, and another to the technic of their use.

Various intestinal conditions requiring intubation, such as ileus, are treated in some detail. Lesions of the colon occupy a separate chapter. There are chapters also on the nursing care of the patient and on intubation for infants and children, with the special technics and precautions advisable in such cases. An especially praiseworthy feature is a chapter on possible errors and the safeguards that may be set up and maintained against them.

Handbook of Surgery. By Eric C. Mekie and Ian Mackenzie. Baltimore: The Williams and Wilkins Company, 1949. 2d ed. Pp. 764, with 29 illustrations.

This is a compact but comprehensive book on general surgery, planned as a manual of immediate reference. As such it is admirably worked out, representing a substantial improvement over the first edition of seven years ago. No alteration has been made in the general intention, but new material has been added and old material revised to bring it up to date. The result is a book easy to consult and helpful to depend on in an emergency.

Mr. Mekie is Professor of Clinical Surgery at the King Edward VII College of Medicine at Singapore. Mr. Mackenzie is the First Assistant in the Department of Surgery at the University of Durham. They have based their work largely on teaching experience and a first-hand knowledge of what the student needs. Sir John Fraser, who contributes the foreword, says: "It is true that there are many surgical textbooks which fulfil the desiderata . . . but I believe that it" (*A Handbook of Surgery*) "will be a success. . . . I am impressed by the manner in which the subject is presented. The authors have avoided the pitfall of unnecessary detail and have brought out the essential and important aspects."

The book's range covers the entire field of general surgery. The illustrations, though comparatively few for a volume this length, are excellently chosen and well executed. A list of 267 pertinent references completes the work.

Advances in Surgery. Compiled and edited by the Editorial Board of Interscience Publishers. New York and London: Interscience Publishers, 1949. Vol. 2. Pp. 590, with approximately 50 illustrations.

The Editorial Board responsible for this up-to-date compendium is headed by Dr. William DeWitt Andrus as Chairman. The members of the Board are Hugh Cavins of Oxford, Edward D. Churchill of Boston, Clarence Crafoord of Stockholm, Lester R. Dragstedt of Chicago, Emile Holman of San Francisco, John S. Lockwood of New York, D. W. Gordon Murray of Toronto, Alton Ochsner of New Orleans and Isidor S. Ravdin of Philadelphia. Volume 2 covers the following main topics: pulmonary function in relation to thoracic surgery; surgery of the esophagus; the surgical treatment of hypertension; congenital anomalies of the heart and great vessels; craniocerebral injuries; the use of streptomycin; skin grafting; tumors of the peripheral nerves; tumors of the testis, and management of carcinoma of the pancreas and duodenum. All subjects are treated primarily from the point of view of recent additions to surgical knowledge and new developments in technic, with an evaluation of the results of various methods.

The contributing authors are all well known in their several fields. The chapter on pathologic aspects of peripheral nerve tumors, by Dr. N. Chandler Foot, is of particular interest and is well illustrated with photomicrographs, some in full color. Charts, graphs, line drawings and statistical tables implement the book throughout, providing a good source of quick reference for correlative study or writing. A sufficient but not excessive list of bibliographic references follows each chapter, providing an example of economy which many surgical writers would do well to follow. The work is adequately cross-indexed—another good point—and the illustrations, the majority of which are charts, graphs and line drawings, are so planned and distributed as to furnish optimum implementation.

The First Anesthetic By Frank Kells Boland Athens, Georgia University of Georgia Press, 1950

Perhaps a more satisfactory title for this book might be "The First Anesthetist" rather than "The First Anesthetic," since its chief concern is the identity of the man who first discovered and administered a surgical anesthetic Asserting emphatically that the hero in this drama was the Georgia physician, Crawford W Long the author does what he can to eliminate the possibility of anyone else's tire tracks covering up Dr Long's "footprints in the sands of time" Crawford Long of course emerges as the dominant figure but at the outset anesthesia itself is the protagonist the beginning chapters being devoted to a comprehensive survey of primitive sleep inducing agents antedating the knowledge that alkaloids were the active principle in making soporific drugs soporific Known methods of mitigating pain, including mesmerism and drugs taken by mouth were not only lacking from a utilitarian point of view but were hampered by tradition and religious opposition

Belief in the possibility of painless surgery had long existed, but its actual achievement was delayed until 1842, when ether was administered by Dr Long while he removed a tumor from a patient's neck

The young doctor apparently recognized the magnitude of his discovery, but his apprehension of the opinion of influential colleagues who still doubted the value of sleep inducing drugs may [illegible] been responsible for his long delay in demanding recognition There are both witnesses and documents however to substantiate his initial performance and it was chiefly his own reserve and lack of initiative that gave precedence to later anesthetists The predominant purpose of this work therefore is to refute the primary claims of Wells Morton and Jackson The author does not deny that Morton was the first public demonstrator of ether anesthesia but he insists that Crawford Long should be re[illegible] as its progenitor He bases his conclu[illegible] the fact that Morton admitted obtaining [illegible] knowledge of the safety and effectiveness of [illegible] from Jackson who had ample opportunity [illegible] a sufficiently inquisitive nature to lead him [illegible] appropriate Long's discovery Numerous det[illegible] are introduced to show that Jackson at the ti[illegible] was fired with the idea that posterity would ow[illegible] a boundless debt as the discoverer of anes th[illegible] while the practical Crawford Long had been utilizing the agent in at least five operations before it [illegible] so used by any other Long had his con stit[illegible]ts including at one time the eminent Dr Mar[illegible] Sims and they expounded his claims vehemently to any skeptics

The book is well written, every possible proof is investigated, and profuse documentation is presented, but some of the facts are rendered inconclusive by preoccupation with detail There will be controversy as long as there is doubt In the last analysis this is not important Since it is the work one considers and not the man, the real question with regard to anesthesia is not what has been done and who did it, but what further work can and will be done as a result

The Urinary Function of the Kidney By A V Wolf New York Grune & Stratton, Inc, 1950 Pp 363, with 49 illustrations

This is a physiologic study of renal function in relation to the urinary tract It is thoroughly scientific in concept and presentation, opening with an exhaustive coverage of the subject of water balance and fluid transfer

Dr Wolf is an experienced investigator and teacher and has framed his work to meet the needs not only of the physiologist but of the clinician and the pharmacologist

The book is lavishly supplied with charts, tables and diagrams, and as is suitable to a presentation of this kind, includes a prodigious bibliography covering more than fifty pages There is also a well organized index of pertinent cross references

Among the topics of emphasis are renal physiology in general hydration and dehydration, diuresis and diuretic preparations the role of the endocrine glands in urinary function, and "body water compartments" The entire work of course, is highly technical and distinctly specialized, nevertheless it makes easier reading than might be expected, since the author writes well and clearly and wastes no words

Le Insufficienze Acute Del Circolo Periferico—Lo Shock By Luigi Imperati Naples Casa Editrice V Idelson, 1950

The story of shock has been written and rewritten many times It is a topic for research with endless possibilities The subject is so endless and the problems so great that any contribution of worth is welcomed Prof Imperati, Director of Surgical Pathology at Sassari University, has made an excellent contribution to the subject of shock

Prof Imperati has divided his work into nine chapters, the last of which concerns the treatment of shock The most interesting paragraphs of this chapter treat of surgical problems in shock therapy Among the subjects discussed are surgical resuscitation cardiac massage, nerve block and the carotid sinus reflex

The book is warmly recommended as a scientific work on shock [illegible] Opera-

[illegible]

Brachial [illegible]

[illegible]

shoulder

[illegible] noted [illegible]

Fatality aft

F. B. [illegible]

1950

[illegible] following an [illegible] a technic [illegible] was 1 fatality [illegible] needle into th [illegible] proach. The [illegible] superior [illegible] hours lat [illegible] and in 2 the bladder was spared. Of the total number of patients, 16 are living and 13 are dead.

The authors report a 22 per cent recurrence rate, but when one considers that only patients for whom other methods of therapy had been exhausted were chosen it is not too discouraging. The fact that only 32 per cent had demonstrably cancerous nodes, despite the magnitude of the cervical lesions, encourages one to feel that perhaps a certain number of such patients may be permanently salvaged, provided surgeons are prepared to make a sufficiently vigorous attack upon the disease

In conclusion, the authors state that the patient can not only survive the operation but resume normal life and appear to be happy in doing so The time element, however, is insufficient to justify evaluation.

CHARLES C ABBOTT

Brachial Plexus Lesions after Cholecystectomy. Kilch, L G, Lancet 1.103, 1950.

The changing trend of opinion as to the causative factors of postoperative brachial paralysis are discussed

Preference appears to have been given to extraneous pressure on the nerves until the theory of traction damage was advanced by Gerdy. Kilch reviews the tests of Horsley (1899), who produced complete traction disruption of the plexus by dropping cadavers on their heads so as to cause violent lateral flexion of the head and depression of the shoulder.

Such factors as postfixation of the plexus, cervical ribs and hypertrophied scalene muscles are reviewed and commented upon

An increased incidence of these lesions has been noted since the widespread use of curare was begun

HARVEY E. BILLIG, JR.

Fatality after Abdominal Arteriography. Wagner, F. B, Jr, and Price, A H. Surgery 27 621 1950.

Wagner and Price describe a bizarre accident following an attempt at aortic arteriography With a technic which they have used in 50 cases there was 1 fatality This followed introduction of the needle into the aorta through a translumbar approach The needle evidently entered the orifice of the superior mesenteric artery, and the patient died a few hours later, apparently of mesenteric thrombosis Postmortem examination was not performed

The solution injected was 80 per cent sodium iodide (10 cc) The authors now recommend the use of a 30 per cent solution for adequate visualization of the site of introduction of the needle for the aortographic procedure They express the opinion that injection of a less concentrated solution will not tend to cause arteriospasm or even damage of the intima

M. T FRIEDELL

The Female Urethra Sieci, J. V ; Lisa, J. R , and Thom, C. H., Am. J. Surg 79 499, 1950.

The authors studied 21 urethras in the fetus, the newborn, the infant and the adult In excision of the urethra all the surrounding soft parts, such as the anterior vaginal wall, the urethrovesical area and the lateral tissues extending to the periosteum were included With some of the fetal specimens the suprasymphysial abdominal wall and the bony structures were also included The urethras were sectioned longitudinally and cross-sectioned serially. The stains used were routine hemotoxylin and eosin and special stains for accurate differentiation of connective, elastic and nerve tissues

Histologically the urethra may be divided into three portions, namely, the upper, middle and lower thirds The upper third is in reality a continuation of the bladder, as the musculature of the vesical wall forms that part of the urethra The middle third is characterized by an outer layer of circular striated muscle and a well vascularized inner layer of fine involuntary muscle bundles The lower third is characterized by a fibrous structure and is free of muscle of any type The epithelium of the urethra is of the stratified squamous type and is attached to the underlying structures, this extends the entire length of the urethra. The substantia propria extends the entire length of the urethra In the upper and middle thirds it is composed of fibrous connective tissue rich in fine elastic fibers and moderately rich in blood vessels In the lower third it becomes extremely thick and is a mass of fibrous tissue.

Continuing their observations, the authors report the following negative observations 1 There are no lymphatic glands in the urethra 2. There is no intrinsic voluntary muscle sphincter 3 There are no fascial sheets and no compartments pierced by the urethra

CHARLES C ABBOTT

Femoral Herniorraphy. Hughes, E S R, and Fathi, J. T, Lancet 1 620 622, 1950

Hughes and Fathi report good results with the inguinal operation for femoral hernia They turn downward the inferior portion of the transversalis fascia to form a new septum for the femoral ring The flap of fascia is united to Cooper's ligament by 3 silk sutures, which cause the flap to rotate without tension and completely close the femoral ring

Reconstruction of the posterior wall of the inguinal canal is accomplished by suturing the upper flap of the transversalis fascia to the inguinal ligament at its junction with the lower edge of the former.

The removal of a large sac leaves a space at the saphenous ring. This may be partially obliterated by suturing the superficial fascia to the fascia lata. The operation is completed by overlapping the external oblique muscle anterior or posterior to the cord. In the absence of strangulation the neck of the sac is freed by blunt dissection. In the presence of strangulation the sac is opened and the bowel inspected before the neck of the sac is freed, so as to avoid the accidental reduction of strangulated bowel.

Excellent results have followed this operation. Thirty-one cases have been followed for two years or more. There has been no recurrence, either in the femoral region or in the inguinal incision.

LEIGH F. WATSON

Superfetation in Uterus Bicornis Unicollis: A Case Report. Mizell, V. D., J. Nat. Med. Assoc. 42:73, 1950.

Embryologically the uterus and the vagina are formed by the fusion of the two müllerian ducts. Union takes place from below upward. Failure of fusion anywhere between the extremities of the two canals can explain almost all forms of "uterus didelphys." Statistics indicate that double uterus is rare. It occurs about once in every 2,000 cases. In 1922 Miller reported 54 cases of double uterus pregnancies in a single horn. Schauffer reported 11 cases of the same type. Kehrer in 1900 reported that in 78 per cent of his series of 84 cases of uterus didelphys there were rudimentary horns.

Positive diagnosis may be made by an observant obstetrician early in pregnancy in about 20 per cent of cases of didelphys. The location of the round ligament is a good differential point in diagnosis. De Lee has stated that in most cases double uterus is discovered at the operating table.

The case reported is that of a primiparous Negro housewife aged 27, admitted to the hospital on Nov. 21, 1946, for delivery by cesarean section ten days prior to the expected date of labor. A diagnosis of contracted pelvis had been made a year before, when a stillborn infant was delivered by section after the patient had been in labor for eighteen hours. The birth was estimated to be three weeks overdue. Roentgen study confirmed the opinion that there was a disproportion between the pelvic outlet and the presenting part. A cesarean section was performed, and a normal eight and one-half months' baby was delivered. Attached to the left side of the uterus, from which the fetus was removed, was a horn. The fetus was removed by the Porro type of section. The left uterus was about the size of a grapefruit and had the appearance of gravid uterus of three months. The age of the fetus in left uterus was confirmed; one month later the patient aborted a four-month fetus.

In December 1947, thirteen months later, a pregnancy in the left uterus had progressed to term. A Porro section was performed at the request of the patient.

G. F. DOUGLAS

The Fate of the Foreskin. Gairdner, D., Brit. M. J., 2:1433, 1949.

None of the commonly advanced reasons for circumcision are convincing. During the first year or two of life, when the infant is incontinent, the prepuce fulfils as essential function in protecting the glans. The development of the prepuce is incomplete in the newborn male child, and separation from the glans, rendering it retractable, does not usually occur until some time between the ages of 9 months and 3 years. In the light of these facts a conservative attitude towards the prepuce is proposed, and a routine for its hygiene is suggested under which many circumcisions could and would be eliminated.

EDMUND LISSACK

Simple Excision of Lung Abscess. Holman, C. W., Surgery 27:546-550, 1950.

The author reports on 3 patients on whom local excision was performed for single chronic pulmonary abscess. Although the series is small, the success of this method indicates that it will be used in a greater number of cases.

The author presents five prerequisites for a successful local excision of a chronic pulmonary abscess:

1. A single abscess in which lobectomy would sacrifice too much normal lung tissue.
2. Infecting organisms sensitive to antibiotics.
3. A certain degree of chronicity of the abscess. (This is desirable, if not essential.)
4. A bronchial stump covered with either a pleural flap or a free pleural graft.
5. Expert anesthesia, careful dissection, adequate blood replacement and attentive postoperative care, with use of antibiotics as in other surgical procedures on the lungs.

There were no complications and no deaths among the 3 patients who underwent operation under these conditions.

M. O. CANTOR

Armamentarium

Therapeutic Drugs Parke, Davis and Company of Detroit announce the availability of "Chloromycetin Kapseals" in a new package size. The preparation is said to be effective against a variety of virus, rickettsial and bacterial infections, notably typhoid, typhus, and undulant fevers, bacillary urinary infections, atypical pneumonia, Rocky Mountain spotted fever, lymphogranuloma venereum, herpes zoster (shingles), and whooping cough. It is now supplied in hermetically sealed capsules containing 250 mg., in packages containing *16 capsules and in bottles of 100*.

The same company presents "Penicillin S-R with Dihydrostreptomycin," a combination of soluble and repository types of penicillin together with dihydrostreptomycin, possessing substantially the same antibacterial properties as the parent drug and a somewhat lower toxicity. The contents of each rubber-diaphragm-capped drain-free vial, when diluted with 3.3 cc. of aqueous diluent, provides a single dose containing 300,000 units of crystalline procaine penicillin G, 100,000 units of crystalline sodium penicillin G, and 1.0 Gm. of dihydrostreptomycin (sulfate). The compound is recommended by the makers in treatment of infections due to gram-positive and gram-negative organisms. It is said to be particularly useful when mixed infections are involved, such as subacute bacterial endocarditis and infections of the urinary tract, also in the preparation and protection of surgical sites. Penicillin S-R with Dihydrostreptomycin is supplied in single-dose vials in individual cartons.

Recording Thermometer A continuous record of actual temperatures in refrigeration is offered by the Minicorder, a self-contained recording thermometer developed by the Tagliabue Instruments Division of the Weston Electrical Instrument Corporation. According to the manufacturers, the minicorder requires no connection to any power supply, yet records temperatures over a period as long as seven days without attention. It is therefore suggested for the storage and refrigeration of medical supplies.

"Atomic Robot" for Diagnosis of Brain Tumor Under the guidance of the doctors at Northwestern Medical School an electronic device called the "Isotron" pinpoints brain tumors which have baffled even expert diagnosticians. With this atomic robot the doctors expect to prevent many unnecessary skull operations and speed the necessary ones by accurate location of tumor tissue.

The new technic as developed by Dr. Loyal Davis and his associates Drs. Leroy, Cooper and Ashkenazy, with physicist Ted Fields, seems deceptively simple. Instead of the skull incisions formerly necessary in many cases, the procedure consists simply of giving the patient an injection of a radioactive isotope. This radioactive "tracer" accumulates in the tumor tissue and sends out "messages" which are received by the two Geiger counter arms of the Isotron. Readings are taken at 32 spots on the head. Within a few minutes the experts can determine definitely the existence and location of any possible tumor tissue.

The instrument was designed by the Nuclear Instrument and Chemical Corporation of Chicago. The drug used to carry the radioactive isotope is diiodofluorescein. This drug was specially formulated for the purpose by Abbott Laboratories of North Chicago, Illinois, and contains controlled amounts of radioactive iodine. Upon entering the blood stream, the formulation gradually concentrates in tumor tisse, and the Geiger counters of the Isotron detect it easily and precisely. If no tumor is present, a different reaction is obtained.

Antihistaminic Cream Sharp & Dohme, Incorporated, announces the release of "Topaminic," a new antihistaminic, analgesic cream for prompt relief from acute itching due to atopic and contact dermatitis, as well as a variety of other allergic skin disorders. The cream is said to suppress the effects of histamine-like substances that may be released in the skin during allergic reactions and to arrest the uncontrollable desire to scratch, thus minimizing the secondary infections that sometimes occur in irritated, excoriated skin. Eczema, urticaria, angioneurotic edema and dermographia are among the conditions for which it is recommended.

Drug for Premenstrual Tension Pyrabrom, a recently discovered compound, has been found effective in the treatment of premenstrual tension and motion sickness, according to a statement released by officials of the Brayten Pharmaceutical Company, who state that research has demonstrated the drug's effectiveness in minimizing premenstrual water retention and accompanying gain in weight. In a series of 57 controlled clinical cases the average gain in weight during the week prior to menstruation was 3.8 pounds (1.7 Kg.). When the same series of patients was given Pyrabrom medication, the gain was only 1.7 pounds (0.8 Kg.). Relief of subjective symptoms (breast soreness, fullness of ankles and breast, low back pain, headaches and general nervousness) is reported to be outstanding.

Pyrabrom will be dispensed only on a physician's prescription.

In Memoriam

DESIDERIO ROMÁN

M.D., F.A.C.S., F.I.C.S.

In the passing of Dr. Desiderio Román of Philadelphia the International College of Surgeons and the world at large have lost an active participant of impressive stature, a man whose outlook was genuinely universal and whose humanitarian impulses were unbounded. A Past President of both the United States Chapter and the International College, Dr. Román worked indefatigably to further the interests of surgical science on a worldwide basis.

Of a distinguished Nicaraguan family—he was a brother of the late Dr. Victor Román y Reyes, President of Nicaragua, and an uncle of the present chief executive, General Anastasio Somoza—Dr. Román, as a citizen of the United States, maintained throughout his long and fruitful career his original deep concern for Pan-American relations. National mourning has been ordered throughout Nicaragua.

Dr. Desiderio Román

Coming to the United States in 1889, Dr. Román studied at the New York University Medical School. He continued his training in Philadelphia at Hahnemann Medical College and Jefferson Medical College, receiving his doctor's degree from the latter in 1893. He completed his internship at Hahnemann Hospital, after which he studied abroad for a time. In 1909 began his long official association with Hahnemann Hospital, of which he became Senior Surgeon and Professor of Clinical Surgery. He was associated also with St. Luke's and Children's Medical Center from 1906 until the time of his death, serving as Surgeon-in-Chief and head of the Department of Surgery. It was in the latter institution that he died, at the age of eighty, ending a professional career of well-deserved eminence.

Dr. Román's friends will remember him no less as a true citizen of the world than as a famed surgeon and an honored and honorable man. He made and kept himself familiar with cultural centers all over the world. His postgraduate work at the Universities of Heidelberg, Berlin, Vienna, Prague, Berne, Paris and London contributed strongly to his cosmic interests, and he returned frequently to these cities to renew old acquaintance and refresh his spirit; for he was no recluse, but a man to whom friendship and collaboration meant much. He was twice president of the Philadelphia County Medical Society, once of the Philadelphia Chapter of the Pan-American Medical Association; a Founder and Fellow of the American Board of Surgery; a member of the Board of Governors of the American College of Surgeons; a member of the Pennsylvania Medical Society, and a Fellow of the American Medical Association. His presidency of the International College of Surgeons extended from 1943 to 1945.

Despite the fact that his life and usefulness were spared to what is generally considered a ripe age, Dr. Román's death must still be considered untimely. The world can ill do without such men today.

Dr. Román is survived in the United States by his wife and by a nephew of his own name, Dr. Desiderio Román of Philadelphia. The International College of Surgeons extends to all the bereaved its wholehearted sympathy and condolence in their loss.

Fifteenth Annual Assembly

International College of Surgeons

United States Chapter

GENERAL INFORMATION

Scientific Sessions —

Tuesday, October 31 through Friday, November 3
Cleveland Public Auditorium

Special Sessions —

Urological — Clubroom C — Auditorium
Wednesday at 9 a.m.
Eye, Ear and Nose — Clubroom B — Auditorium
Wednesday at 9 a.m. and 2 p.m.; Thursday 10 a.m. and 2 p.m.
Orthopedic — Clubroom C — Auditorium
Wednesday at 2 p.m.

Scientific Motion Picture Program —

Tuesday through Friday, 10 a.m. to noon and 2 p.m. to 5 p.m.
In the Motion Picture Theatre at the Auditorium

Television —

Wednesday through Friday from 9 a.m. to 1 p.m. Originating at St. Vincent Charity Hospital
Viewing facilities in the Auditorium — Courtesy, Smith, Kline & French

Banquet —

Dr. Chester Trowbridge, Chairman
Thursday evening in the Grand Ballroom, Statler Hotel at 7:30 p.m.
Information and Tickets at the Registration Desk
Frank Lahey, M.D., F.A.C.S., Boston, Mass., Guest Speaker

Convocation —

Music Hall, Auditorium, Friday evening at 7:30 p.m.
Francis D. Wolfe, M.D., F.A.C.S., F.I.C.S., Convocation Chairman
Ernest F. Purcell, M.D., F.I.C.S., Director of Pageant

Ladies Entertainment —

Mrs. Hudson D. Fowler, Jr., General Chairman
Information at the Registration Desk

Technical Exhibits —

Cleveland Public Auditorium

Journal of the International College of Surgeons —

Information in Booths 125 and 127 — Cleveland Public Auditorium

College Gowns —

Information — Hotel Cleveland, Cleveland Public Auditorium
Mr. Norman Stecker in charge

CHANGE IN ANNUAL SUBSCRIPTION RATE

Starting with the January 1951 issue the annual subscription rate for the Journal will be Twelve Dollars $12.00, domestic or foreign.

Not only the mounting costs of production but higher costs incidental to preparing editorial and text matter and meeting distribution and postal requirements make the increase from $10.00 to $12.00 annually (12 issues) necessary.

The change is made reluctantly, but it is required to maintain the high standard of the Journal. We ask the cooperation of our members and subscribers.

UROLOGICAL POST GRADUATE CONVENTION

November 6 to November 10, 1950

Waldorf-Astoria Hotel

Presented by the New York Society
of the American Urological Association

- An intensive refresher course in Urology.
- Lectures and Clinical demonstrations by authorities from New York's leading universities and clinics.
- Five full days and three evening meetings.
- Anatomical and Pathological demonstrations.
- Motion pictures and lantern slides.
- Opening night banquet and five daily luncheons at Waldorf-Astoria.

All inclusive—$125.00
Registration limited to first 300 applicants.
Requests for further information and application to:

Dr. Thomas J. Kirwin, Chairman
1 E. 63 St., New York City 21

TECHNICAL EXHIBITS

FIFTEENTH NATIONAL ASSEMBLY
of the
UNITED STATES CHAPTER
of the
INTERNATIONAL COLLEGE OF SURGEONS

CLEVELAND AUDITORIUM, CLEVELAND, OHIO
OCTOBER 31, NOVEMBER 1, 2, 3, 1950

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hal Sodium, an intra
ort acting barbiturate,
Dayamin, a multiple vitamin capsule, and various types of prepared solutions and intravenous solution equipment.

THE ALKALOL COMPANY, Taunton, Mass. (Booth No 306) The Alkalol Company, Taunton, Massachusetts will feature Alkalol the balanced, alkaline, saline solution for the treatment of mucous membranes and irritated tissues It is bland, nontoxic, and effective, and has been a favorite since 1896 We are also showing Irrigol, a powder which in solution makes an aseptic, slightly astringent vaginal douche It is widely used also for colonic irrigations and as an effective rectal enema

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laboratory equipment and supplies stocked by the 'world's largest surgical supply house.' Featured are many new items which you will want to see and have demonstrated."

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the educational bulwark of school children—more than 800 000 sets have been sold

AMERICAN BLOOD IRRADIATION SOCIETY (Booth No 123) Ultraviolet blood irradiation by the 'Knott technique" is continuing to prove to be a very valuable
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AMERICAN SAFETY RAZOR CORPORATION, Brooklyn, New York (Booth No. 132)

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down position in thoracic work as well as surgery in the minor category.

The Albee Comper Orthopedic Table will be demonstrated under actual clinical conditions and the new intra medullary nailing device for maintaining the patient in a unilateral position for intra medullary nailing of the lower extremities, the Watson Jones position for the first time on an orthopedic table.

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choleretic agents for the treatment of biliary tract diseases."

ARMOUR LABORATORIES, Chicago, Illinois (Booth No 204) The Armour Laboratories will welcome members of the International College of Surgeons to visit the Armour Exhibit, booth No. 204, while attending their Annual Convention

Information and literature on many new items in the field of Endocrinology recently made available to the medical profession by The Armour Laboratories may be secured at the Armour booth

AUSTENAL LABORATORIES, INC., New York, New York (Booth No 208) Vitallium Surgical Appliances exhibited will feature several new items
- An improved McLaughlin appliance for intertrochanteric fractures.
- Coaptation Bone Plates
- A Plate and screw sterilizing rack.
- Hip Nail Driver Extractor Sets
- Socket wrenches for Vitallium bolts and nuts.
- Screwdrivers for Vitallium Screws.

We invite your inspection and discussion of the new appliances and instruments as well as of the regular improved line of Vitallium Surgical Appliances Mr Wallace L Terhune and Mr Crosby B Washburne will be in attendance.

INC., Danbury, Connec
Bard Parker 'Rib Back'
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at makes for blade econ
pes Bard Parker Germi
LOROPHENYL, instru
Reese Dermatome—for

RUDOLPH BEAVER, INC., Waltham, Mass. (Booth No. 212) The Beaver knife is superior because all its sturdy blades, in 13 different shapes fit every on of the 3 stainless steel handle shapes No weakening holes in the blades New and original blade shapes permit improved techniques Bent blades for deep surgery as in cholecystectomy, hysterectomy, thoracic surgery And they are sharp! A new development is an eye knife *with replaceable blades* of Von Graefe and Jaeger shapes, in various sizes.

BECTON, DICKINSON & COMPANY, Rutherford, New Jersey (Booth No. 103). We invite you all to visit our booth where we will have on display our general line of [illegible] .nd needles, clinical thermometers [illegible] .Ve will also exhibit Vacutainer equipment and diagnostic instruments with emphasis on our Aneroid Manometer.

BILHUBER-KNOLL CORPORATION, Orange, New Jersey (Booth No. 303).Visit the Bilhuber-Knoll Booth No. 303 for the latest information on their original medicinal chemicals, Bromural, Dilaudid, Metrazol, Theocalcin, Octin, etc. The non-barbiturate antispasmodic and sedative, Valoctin, and the antiasthmatic Quadrinal, will also be of interest. Your discussions of these and other time-proved prescription chemicals will be welcomed.

BLUE SHIELD MEDICAL CARE PLANS, Chicago, Illinois (Booth Nos. 130, 131). Designed as a hospitality and service center, the Blue Shield exhibit portrays a man's den or library. On behalf of the more than 16,000,000 members in seventy Blue Shield Plans, it is hoped the doctors will find the exhibit a comfortable spot in which to relax and learn the latest developments of their own medical care plans.

BROLI INSTRUMENTS, INC., New York, New York (Booth No. 429). BROLI INSTRUMENTS, INC. will show the following Swedish Stainless Steel Surgical Instruments; Hemostats, Scissors Tissue and Thumb Dressing Forceps, Needle Holders, Towel Clamps, Bone Gouging and Cutting Forceps, Rongeurs, Chisels, *Osteotomes*, Currettes, and Uterine Scissors. All Broli Instruments are manufactured in Eskilstuna, Sweden.

CAMEL CIGARETTES, New York, New York (Booth Nos. 105, 106). CAMEL Cigarettes will feature color slides of background data from their newest research. After weekly examinations of the throats of hundreds of men and women smoking CAMEL Cigarettes exclusively for thirty days, throat specialists reported "Not one single case of throat irritation due to smoking CAMELS."

CAMERON HEARTOMETER COMPANY, Chicago, Illinois (Booth No. 423). See the improved Heartometer, a scientific precision instrument for accurately recording systolic and diastolic blood pressures, also furnishing a permanent graphic record of the pulse rate, disturbances of the rhythm, myocardial response, the action of the valves, as well as peripheral vascular circulation. The Heartometer clearly reveals heart disturbances in both early and advanced stages and is of great value in checking the progress of treatments.

CAMERON SURGICAL SPECIALTY COMPANY, Chicago, Illinois (Booth No. 111). See the new Accessories for all phases of Electro-Surgery, Electro-Cauterization, Electro-Coagulation, Desiccation and Fulguration; Cameron Surgical Units; Electro-Diagnostic Lamp and Instrument Outfits; the new stainless steel Boros Flexible Esophagoscope and other Peroral Equipment; Flexible Gastroscopes; Coagulair and Dualite Sigmoidoscopes; Tele-Vaginalite; Mirrolite and other Headlites; Binocular Loupes, Illuminated Specula, Endoscopes, Retractors and other instruments for all types of Diagnosis, Treatment and Surgery.

CAMPBELL ASSOCIATES, Cincinnati, Ohio (Booth No. 403). Campbell Associates of Cincinnati will feature at their exhibit at the convention a complete exhibit of surgical instruments and specialties. Included will be instruments of both domestic and imported German manufacture. Campbell Associates invites its many friends in the surgical profession to visit its exhibit.

CHATHAM PHARMACEUTICALS, INC., Newark, New Jersey (Booth No. 422). KOAGAMIN, CHATHAM'S parenteral blood coagulant, has received favorable and ever-increasing acceptance by surgeons since its introduction to the medical profession twelve years ago. It is systemic in action, non-toxic and offers rapid control in venous and capillary bleeding. A visit from you during the meeting will be sincerely appreciated.

CIBA PHARMACEUTICAL PRODUCTS, INC., Summit, New Jersey (Booth No. 219). Ciba Pharmaceutical Products, Inc., and its representatives invite you to *Booth No. 219 which features an exhibit* on Heavy NUPERCAINE, the hyperbaric solution for low spinal anesthesia. Literature describing saddle block for obstetric analgesia will be available upon request.

COCA-COLA COMPANY, Atlanta, Georgia (Booth Nos. 401, 402). "Ice-cold Coca-Cola served through the cooperation and courtesy of The Cleveland Coca-Cola Bottling Company and The Coca-Cola Company."

CODMAN AND SHURTLEFF, INC., Boston, Mass. (Booth No. 308). Codman & Shurtleff, Inc., designers and manufacturers of surgical instruments for 112 years, will exhibit at Booth No. 308 a complete line of general and special instruments designed for use in the Orthopedic, Neurosurgical, Thoracic, Vascular, and General Surgery. Many of these instruments were designed for new technics developed by our New England surgeons.

CORECO RESEARCH CORPORATION, New York, New York (Booth No. 211). The "CORECO" Camera is designed to photograph all surface areas of the body—from 1 to 1 close-up pictures to half-body size—and all cavities of the human body, such as mouth, throat, ear, nose, vagina, and rectum. The camera carries its own specially developed, fully color corrected bulb and a mechanism for complete control of its color temperature and exposure within the Camera itself. There is an automatic view finder synchronized with the automatic camera mechanism to permit viewing until a fraction of a second before exposure. The Camera provides for automatic focusing.

DAVIS & GECK, INC., B'klyn, N. Y. (Nos. 101, 102 and Cinema Room A). Davis & Geck, manufacturer of Surgical Sutures, offers the new Anacap Black Braided Silk, outstanding for its tensile strength and handling properties and will demonstrate "timed-absorption" catgut. Both of these are triumphs of continuing D&G research. Technical and product information and literature on these products and the complete line of sutures and suture-needle combinations will be available.

The D&G Surgical Film Library will present a series of color motion pictures showing modern surgical procedures performed by outstanding authorities. Programs and information concerning this service may be obtained at the Cinema Room.

J. A. DEKNATEL & SON, INC., New York, New York (Booth No. 309). Deknatel Surgical Silk—moisture and serum resistant braided, suture. Deknatel Name-On Beads—the ORIGINAL baby bead identification. Deknatel Eyeless Needles—with D.S.S. suture swaged on. Deknatel Surgical Nylon—braided and treated. Deknatel Wound Clips (Michel Type).

DePUY MFG. COMPANY, Warsaw, Indiana (Booth No. 104). "DePuy will exhibit in Space No. 302, Fracture Appliances, S.M.O. Bone Plates, Bone Screws, Bone Instruments, Cervical Collars, Fracture Frames, Rib Belts, Leg Splints and Arm Splints. In fact, everything for the Fracture Surgeon."

DESITIN CHEMICAL COMPANY, Providence, Rhode Island (Booth No. 206). DESITIN OINTMENT, the pioneer in external cod liver oil therapy combines crude high potency Norwegian cod liver oil, zinc oxide and talcum in a modified lanolin petrolatum base. Owing to its content of high natural vitamin A and D concentration and unsaturated fatty acids, Desitin Ointment alleviates pain and relieves itching promptly. It promotes granulation and epithelization. Desitin Ointment is not liquified at body temperature nor decomposed by secretions. Desitin Ointment forms a perfect protection for the skin.

Indications:

Post operative dressings, slow healing wounds, indolent chronic [illegible] 'egrees, lacerations, bed so [illegible]

DESITIN POWDER,

a unique, dainty medicinal toilet powder contains crude cod liver oil, zinc oxide, magnesium oxide and talcum. Uses: As an adjunct to Desitin Ointment for dry treatments.

DOHO CHEMICAL CORPORATION, New York, New York (Booth No. 218). The Doho Chemical Corporation and its subsidiary, Mallon Chemical Corporation, makers of AURALGAN, O-TOS-MO-SAN and RECTALGAN, are proud to announce their new nasal decongestant, *RHIN-*

ALGAN—a balanced formulation of two active chemical compounds that gives prolonged vasoconstriction—used as a spray, in our patented Dohony Spray O-Mizer (combination dropper and spray)—pleasant tasting, with no systemic effect (pressor or respiratory), and can be safely used for infants and children.

Our representatives will be happy to explain the merits of RHINALGAN and distribute samples of this innovation.

THOMAS A. EDISON, INC., New York, New York (Booth No. 324). At the forthcoming convention of the International College of Surgeons, United States Chapter in Cleveland, Thomas A. Edison, Incorporated, Ediphone Division, will exhibit the new and revolutionary Edison Tele-Voicewriter for Clinical Recording—remote recording from many stations to a central point.

This system is the direct result of over five years of research aimed at the development of a specific answer to the problem of producing complete, detailed Medical Records.

ETHICON SUTURE LABORATORIES, [illegible]

Ethi Pack, a new individual silk and cotton packet, pre-cut into proper strands and ready for immediate sterilization and use.

Surgiset—A complete unit for office surgery, sutures sterile and ready for use.

[illegible]

handle. Light bars are sterilizable, lamp standard can be draped with sterile sleeve. Base of lamp standard clamps to table rail.

C. B. FLEET COMPANY, INC., Lynchburg, Virginia (Booth No. 110) C. B. Fleet Co., Inc., cordially invites you to stop by Booth No. 110 for samples and for a visit with the representatives. Perhaps there is something about Phospho-Soda (Fleet), the pure, stable, aqueous concentrate of the two U.S.P. Sodium Phosphates, you would like to discuss with them.

GRUNE & STRATTON, INC., New York, New York *(Booth No. 221). Among the recent books shown by* GRUNE & STRATTON will be STUDIES IN LOBOTOMY, edited by Milton Greenblatt, M.D., Robert Arnot, M.D., and Harry C. Solomon, M.D.; BREAST DEFORMITIES AND THEIR REPAIR, by Jacques W. Maliniac, M.D., INJURIES TO THE ANKLE, by J. Grant Bonnin, B.S.; REGIONAL ILEITIS, by Burrill B. Crohn, M.D., SHOCK and Allied Forms of Failure of the Circulation, by H. A. Davis, M.D.; and Duodenal and Jejunal PEPTIC ULCER, by Rudolf Nissen, M.D.

GUDEBROD BROS. SILK COMPANY, INC., New York, New York (Booth No. 205). Gudebrod's new line of Champion Sterile Tube Sutures of Serum Proof Silk with mintraumatic needles, as well as Champion Dermal Sutures, Champion Serum Proof Sutures and Handcraft Cotton Sutures, will be demonstrated. Since 1870 Gudebrod has developed new sutures of the finest quality for improved surgical technique and rapid wound healing.

UNITED STATES CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS (Booth Nos. 125, 127) The exhibit of the United States Chapter, International College of Surgeons, presents graphically detailed information concerning the activities of the College in all their phases, the principles upon which the organization is founded and functions, the location of its component Chapters throughout the world, its general and educational program and the extent of its activities.

LAMSON LABORATORIES, Seattle Washington (Booth No. 115).

LEA & FEBIGER, Philadelphia, Pa. (Booth No. 424). Lea & Febiger in[illegible] their selection of [illegible] titles, including [illegible] Pneumoencephalo[illegible] Health and Disease, [illegible]

Surgical Management of Vascular Diseases; Partipilo—Surgical Technique and Principles of Operative Surgery, Gray—Anatomy, Herbut—Surgical Pathology; Quiring—Collateral Circulation; Bridges—Dietetics, Lichtman—Diseases of the Liver, Gallbladder and Bile Ducts, and many other books of interest to surgeons.

LEDERLE LABORATORIES, New York, New York (Booth No. 314) You are cordially invited to visit our exhibit in Booth No. 314, where you will find representatives who are prepared to give you the latest information on Lederle products.

[illegible] COMPANY, [illegible]an, Ohio [illegible] Company [illegible] in which [illegible] apparatus will be available for examination and demonstration. Capable representatives will be on hand at all times and we hope you will stop by so that we may become acquainted.

ELI LILLY & COMPANY, Indianapolis, Indiana (Booth No. 216) Your Lilly medical service representative cordially invites you to visit the Lilly exhibit located in Space No. 216. The display for 195[illegible] features a presentation on the incidence and potential number of diabetics in America. The attending representatives will be pleased indeed to assist visiting physicians in every way possible.

J. B. LIPPINCOTT COMPANY, Philadelphia, Pa. (Booth Nos. 201, 203) J. B. Lippincott Company presents an interesting and active exhibit of professional publishing. With the "pulse of practice" centering in an advisory editorial board of active clinicians who constantly review the field, current and coming trends in medicine and surgery are known continually. On the studied recommendations of these medical leaders, Lippincott Selected Professional Books are undertaken.

[illegible] CHEMICAL CORPORATION, New York, [illegible] of Dobo[illegible] liquid topi[illegible] of pain and [illegible] so following perineal [illegible] gynecological work. This ne[illegible] ages over the outmoded [illegible]

Our [illegible] explain in detail the wo[illegible]

MEAD JOHNSON & COMPANY, Evansville, Indiana (Booth No. 311). "Dextri Maltose Oleum Percomorphum, Pablum, Pabena, Olac and other Mead Products used in Infant Nutrition will be on display at the Mead Johnson Exhibit at your International College of Surgeons Meeting. Protenum, a new high protein product, will be displayed. Also, Lonalac, for low sodium diets. Our representatives at the Exhibit will be glad to discuss with you the new improvements of Amigen and Amisets."

[illegible] PRODUCTS COMPANY, Tulsa, Oklahoma (B[illegible] STIMULATOR, low vo[illegible] indicated for Supple[illegible] and acute cases of my[illegible] back pains, bursitis, m[illegible] cular disorders, paralysis, rheumatism and arthritis.

MEDICAL AIDS, INC., Chicago, Illinois (Booth No. 215). Medical Aids, [illegible] of bandages, includ[illegible] Primer combination [illegible] without Zinc Oxide, [illegible] lax rubber threads and Polyestol, an elastomer produced by reacting Methyl Salicylate, indicated in treatment of acute rheumatic conditions, etc.

MERCK & COMPANY, Rahway, New Jersey (Booth No. 223). MERCK & CO., INC. (Booth No. 223) will include the following:

Neo-Antergan—the antihistaminic agent which is advertised to the medical profession exclusively,

Urecholine—for relieving urinary retention, gastric retention, and abdominal distention;

Cobione (Crystalline Vitamin B12 Merck)—for the treatment of megaloblastic anemias; and

PAS (Para-Aminosalicylic Acid Merck)—for complementing streptomycin and dihydrostreptomycin in tuberculosis therapy.

MILLER SURGICAL COMPANY, Chicago, Illinois (Booth 108) are pleased to announce that they are the sole manufacturers of Dr Rudolph Gorsch's Illuminated Stainless Steel Rectal Scopes Proctologists, as well as other physicians interested in this field, will find it worth while to take a look. Other items of interest include their Radio Knife, Reflecto lite Headlite, Miller Ophthalmoscope, as well as other Illuminated and Magnifying Surgical Diagnostic Units which have attracted the attention of so many doctors in general practice, as well as in special fields"

MINNESOTA MINING & MFG. COMPANY, St. Paul, Minnesota (Booth Nos 417, 419).

C. V. MOSBY COMPANY, St. Louis, Mo. (Booth No 213). "You are cordially invited to visit the C V. Mosby Booth No 213, where you will find many new and interesting titles Among some of the most recent releases are Meakins 'Practice of Medicine,' Cleckley 'Mask of Sanity,' Titus 'Management of Obstetric Difficulties,' Berman 'Principles of Surgery,' Browne 'Post Graduate Obstetrics and Gynecology,' Dodson 'Urological Surgery,' Illingworth-Dick 'Surgical Pathology,' plus many others"

V. MUELLER & COMPANY, Chicago, Illinois (Booth Nos 319, 321). "In the V Mueller & Company (Chicago) exhibit, you will see many of the instruments recently developed for the newer surgical procedures These will highlight a large and comprehensive display of fine instruments, special and standard, for every field of surgical practice."

NORTHLAND PRESS, St Paul, Minnesota (Booth No 302) "Saw Ge-Mah" (Medicine Man), a fascinating novel by Louis J Gariepy, M D, of Detroit, Michigan—is featured at the Northland Press booth Woven into the intriguing story of a young man's struggle to become a successful physician are discussions of medical schools, internships, general practice, specialization, group practice, etc A book that every surgeon and all Doctors of Medicine will want to read, Saw Ge Mah" has well been called the story of every medical man

ORTHOPEDIC FRAME COMPANY, Kalamazoo, Michigan (Booth No 315) The Orthopedic Frame Company, of Kalamazoo, Michigan will feature the new Stryker **Dermatome** which will serve the surgeon for both skin grafting, and, by a simple adaption, for use as a safety bone saw Also displayed will be the Stryker Cast Cutter, the Stryker Autopsy Saw, and the Stryker Bone Saw.

PARKE, DAVIS & COMPANY, Detroit, Michigan (Booth Nos 427, 428) Members of the PARKE, DAVIS & COMPANY Medical Service Staff will be in attendance at our Commercial Exhibit for consultation and general discussion covering a group of Parke Davis Products This Exhibit will feature OXYCEL, THROMBIN TOPICAL, and the BENADRYL GROUP, together with the newest Antibiotic, CHLOROMYCETIN, also PENICILLIN S R and their clinical indications and uses The latter modified Penicillin couples rapid acting with a repository component of Penicillin insuring a high level from a single injection for a prolonged period of time You are cordially invited to visit our Exhibit with the assurance that your inquiries and expressions of interest will be given appropriate attention

PHILIP MORRIS & CO , LTD., INC., New York, N Y (Booth Nos 301, 421 & Cinema Room B) will show the results of research on the irritant effects of cigarette smoke These results show conclusively that Philip Morris are less irritating than other cigarettes An interesting demonstration will be made on smokers at the exhibit which will show the difference in cigarettes

PHYSICIANS & HOSPITAL SUPPLY CO , Minneapolis, Minn (Booth No 210)

GEORGE P. PILLING & SON COMPANY, Philadelphia, Pa (Booth Nos 116, 118, 120). George P. Pilling & Son Company of Philadelphia will as always show a complete line of both standard highly specialized surgical instruments and hospital supplies covering the entire field of major and minor surgery Specially featured will be the new Pilling wet cell storage battery which is a radical departure from the standard type of equipment used for powering electrically illuminated instruments Visit the Pilling booth and see what is new and modern in the instrument field

RICHARDS MFG. COMPANY, Memphis, Tennessee (Booth No 122) Instruments for Bone Surgery, including Stainless Chisels, Osteotomes, Gouges, Complete Laminectomy Instrument Sets [illegible] Ronguers, etc Campbell-Boyd [illegible] Bone Plates, Screws, and Kuntsc [illegible] ls for Radius, Ulna, Humerus and Tibia, with Hansen-Street Nails for the Femur. Many other new and improved instruments.

J. B. ROERIG & COMPANY, Chicago, Illinois (Booth No. 113). Members of the International College of Surgeons are cordially invited to visit the exhibit of J B Roerig and Company.

Two new products will be featured—Viterra, a new dietary supplement containing vitamins and minerals, and Heptuna Plus, our newest advance in anti anemic therapy.

Members of the International College of Surgeons visiting from abroad will be particularly interested to learn of the distribution of Roerig products in many countries of the world The Export Department will be particularly pleased to welcome such visitors

RYSTAN COMPANY, Mount Vernon, New York (Booth No 104) RYSTAN will exhibit Chloresium Ointment and Chloresium Solution (Plain), which contain the purified, therapeutically active water soluble derivatives of chlorophyll They are natural, nontoxic agents for the topical treatment of wounds, burns, ulcers and dermatoses These tissue stimulating preparations promote the growth of healthy granulation tissue, and deodorize malodorous conditions by inhibiting the action of anaerobic proteolytic bacteria.

W. B. SAUNDERS COMPANY, *Philadelphia, Pa* (Booth Nos 124, 126) We invite all doctors attending the Assembly of the International College of Surgeons to visit our exhibit where we will display a complete line of our books including Hyman's "Integrated Practice of Medicine" Bockus' "Postgraduate Gastro-enterology," Fine's 'Care of the Surgical Patient," Christopher's "Textbook of Surgery," Orr's "Operations of General Surgery," Smith's "Plastic and Reconstructive Surgery," *Maingot's "Techniques in British Surgery,"* Sweet's 'Technics of Thoracic Surgery," and many other new books and new editions

SCHERING CORPORATION, Bloomfield, New Jersey (Booth No 211) Trimeton and Chlor Trimeton, two outstanding antihistamines, and Coricidin, Schering's new treatment for the common cold, will highlight the exhibit. Micropellets Oreon F Aqueous, 10 cc vials, in two strengths—25 mg and 50 mg. per cc will also be featured.

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SMITH, KLINE & FRENCH LABORATORIES, Philadelphia, Pa (Booth No 322). 'Dexamyl' will be featured at this exhibit. 'Dexamyl'—S K F.'s balanced combination of 'Dexedrine' Sulfate (dextro amphetamine sulfate, S K F) and 'Amytal' (Amobarbital, Lilly)—is a new preparation of wide usefulness in everyday practice Combined in 'Dexamyl', 'Dexedrine' and 'Amytal' work together to provide symptomatic relief from mental and emotional distress

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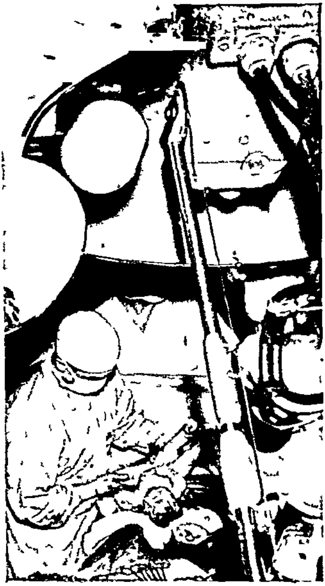

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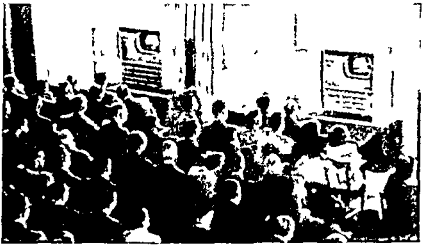

SPENCER INCORPORATED. New Haven, Conn. (Booth No. 107). On display will be Spencer Supports for abdomen, back [illegible] designed to meet the medical [illegible] lual patient. Of special interest are post-operative supports for men, women and children, the Abdominal Spring Pad (patented), and the mastectomy breast support with breast form.

E. R. SQUIBB & SONS, New York, New York (Booth Nos. 305, 307).

TOWER COMPANY, INC., Seattle, Washington (Booth Nos. 313, 317). The outstanding advantages of the Roger Anderson Fracture and Orthopedic Table are now made available for the first time to even the **smallest hospital or clinic.** By a spectacular achievement of engineering design, the table has been modified to preserve the finest features. Cast application to any part of the body, anatomic movements, controlled traction, Trendelenberg positions, and other essential features **now available at the lowest price.**

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VanPELT & BROWN, INC., Richmond, Virginia (Booth No. 222). VanPelt and Brown extend a cordial invitation to visit their exhibit where representatives will be happy to answer questions and supply clinical samples of their products.

WALDEN INDUSTRIES, INC., New York, New York (Booth No. 420). "QUICK-CLIX" is an unusually compact clinical photographic unit combining camera mount, lights and handy finger tip controls. Designed for use with a single lens reflex camera, "QUICK-CLIX" allows you to see what you want and photograph exactly what you see. Ideal for close-up photography (as close as two inches), "QUICK-CLIX" is perfect for color and black and white clinical photography.

WASHINGTON INSTITUTE OF MEDICINE, Washington 6, D. C. (Booth No. 114). The Quarterly Review of Surgery, edited by Dr. Henry N. Harkins and 22 other well known American surgeons, will be exhibited along with the other world famous Quarterly Reviews of the Washington Institute of Medicine.

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F. E. YOUNG & COMPANY, Chicago, Illinois (Booth No. 224). "F. E. YOUNG & CO. will exhibit Young's Dilators; Physician's Pharmacal Service; Sulf-A-Test; PSP Test Set and Young's Albumin Test. Young's Dilators are used in the treatment and prevention of contracted anus, particularly following hemorrhoidectomy, as an aid in perineal dissection and in the repair following delivery. Register for recent reprints. Physician's Pharmacal Service is a comprehensive listing of ethical products in table form for easy reference, kept up to date by monthly supplements and being loose leaf, new pages easily replace former pages. Be sure to see this living encyclopedia. Sulf-A-Test, Young's PSP Test Set and Young's Albumin Test will be demonstrated. These are accurate, rapid office tests replacing the more time consuming laboratory methods."

ZIMMER MFG. COMPANY, Warsaw, Indiana (Booth No. 202). Zimmer Manufacturing Company extends a most cordial invitation to visit their exhibit at booth No. 202. A complete line of fracture appliances and instruments will be on display. Items of special interest include the approved KUNTSCHER CLOVERLEAF INTRAMEDULLARY PINS & INSTRUMENTS, DIAMOND SHAPE INTRAMEDULLARY PINS, JEWETT ONE PIECE NAIL & PLATE, WOODRUFF-CUT PILOT POINT BONE SCREWS, STAINLESS STEEL PROSTHETIC HEAD FOR HIP ARTHOPLASTY, IMPROVED BONE CLAMPS, THREADED WIRES & PINS, OSTEOTOMES, GOUGES, BLOUNT STAPLING SET, A NEW PNEUMATIC TOURNIQUET AND FEATURING THE BROWN DERMATONE, one instrument that every surgeon will want to see.

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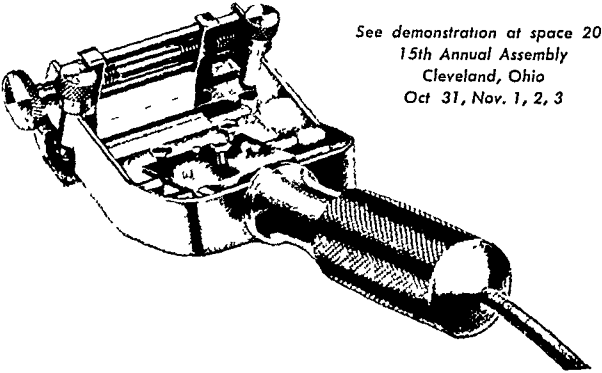

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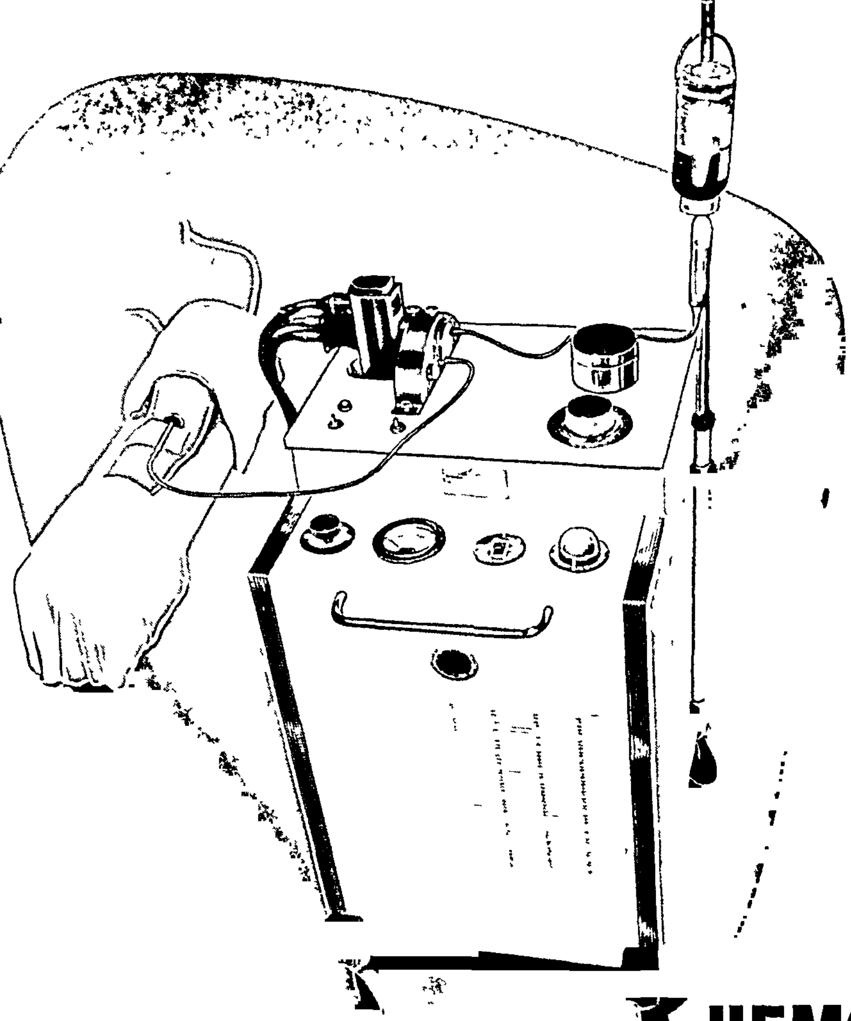

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HEMO-IRRADIATOR

The following reprints and others upon request.

The Role of Ultraviolet Blood Irradiation Therapy, Knott Technic in Surgery: *Journal of the International College of Surgeons,* May-June 1949.

Treatment of Blood Stream Infections with Hemo-irradiation: *Amer. Journal of Surgery,* December 1942.

Irradiated Blood Transfusions in the Treatment of Infections: *Northwest Med.,* June 1934.

Ultraviolet Blood Irradiation Therapy in Acute Virus and Virus-like Infections. *Rev. of Gastroenterol.,* April 1948.

The Knott Technic of Ultraviolet Blood Irradiation in Acute Pyogenic Infections: *New York State Journal of Medicine,* January 1942.

Development of Ultraviolet Blood Irradiation: *Amer. Journal of Surgery,* August 1948.

Ultraviolet Blood Irradiation in the Treatment of Pelvic Cellulitis: *Amer. Journal of Surgery,* October 1947.

Ultraviolet Blood Irradiation in Biliary Disease: *Amer. Journal of Surgery,* August 1946.

Use of Ultraviolet Blood Irradiation (Knott Technic) in Biliary Tract Surgery: *The American Journal of Surgery,* July 1950.

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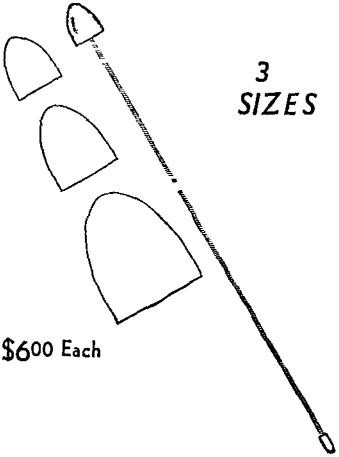

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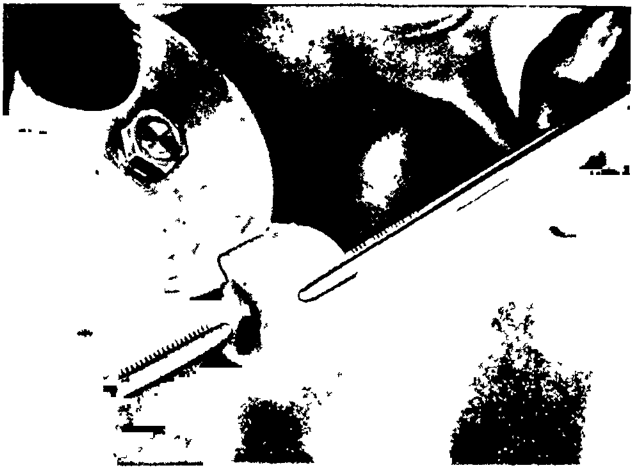

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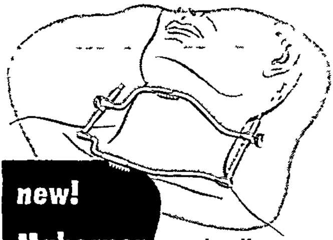

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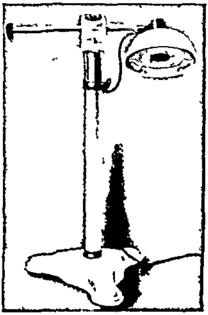

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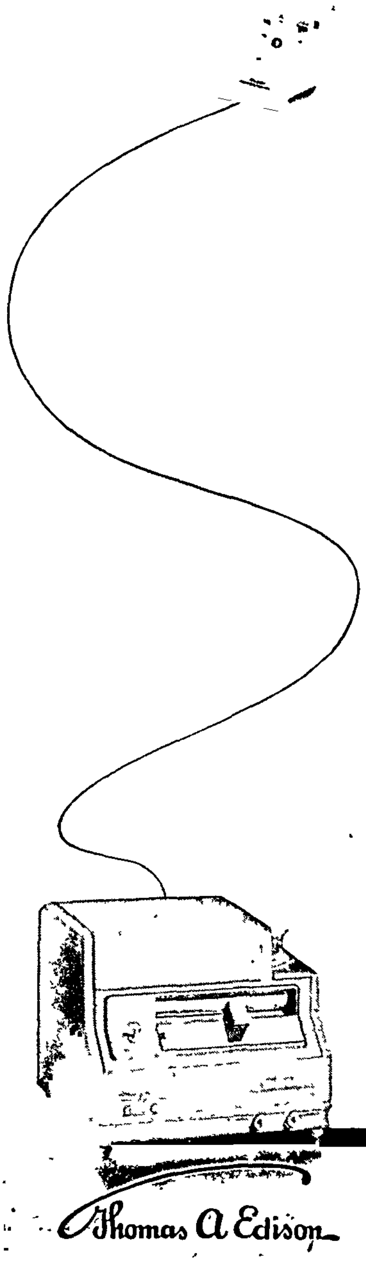

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CLEVELAND, OHIO, OCTOBER 31, NOV. 1, 2, 3, 1950

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Minnesota Mining & Mfg [illegible]	
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Winthrop Stearns Inc New York N Y	318 320
F E Young & Co Chicago Ill	224
Zimmer Mfg Company Warsaw Ind	202

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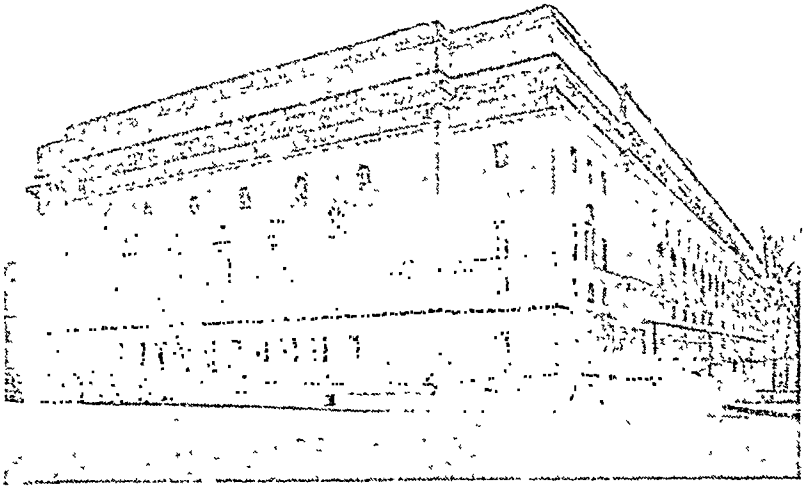

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Official monthly publication of the International College of Surgeons

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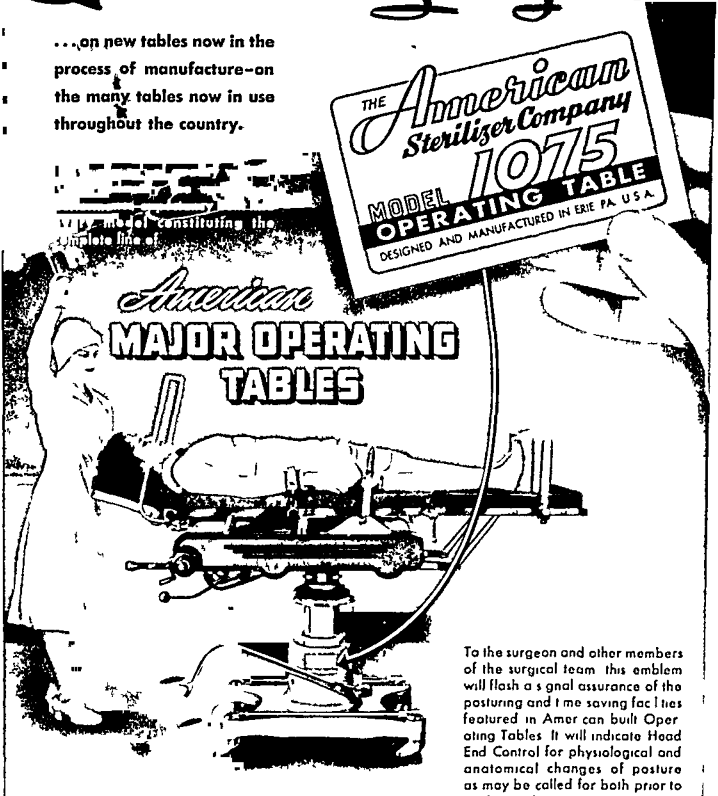
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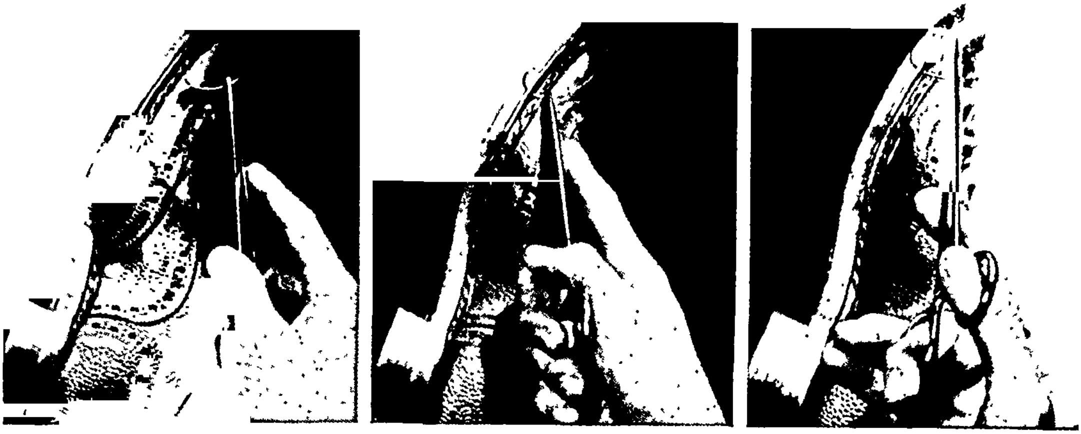

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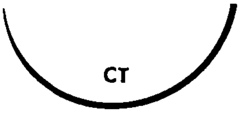

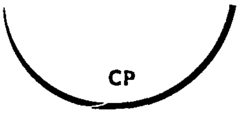

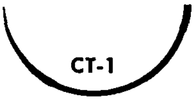

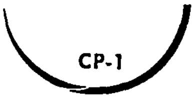

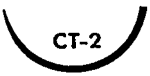

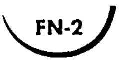

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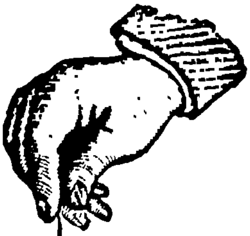

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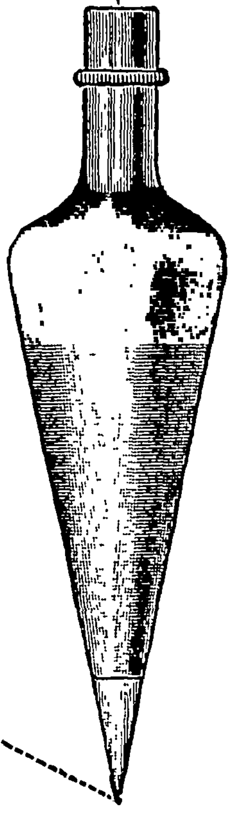

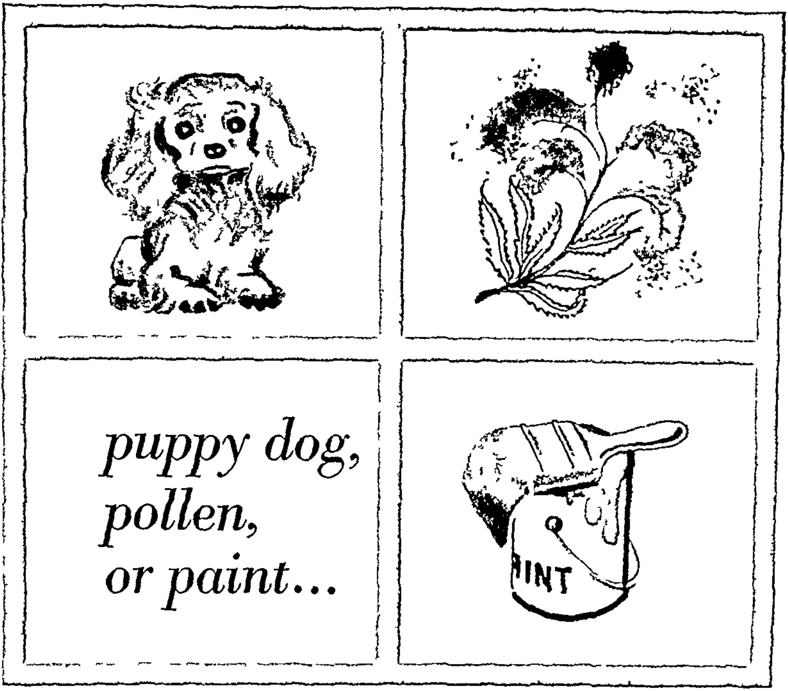

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Foreign Guests: The Assembly program will be highlighted, as always, by addresses from distinguished surgeons of other nations. This is an unparalleled opportunity to keep abreast of modern surgical practice on a world-wide scale.

Banquet and Convocation: The Assembly will reach a brilliant climax in the Annual Banquet, to be held on Thursday evening in the Grand Ballroom of the Statler Hotel. The banquet speaker this year is Dr. Frank Lahey of the Lahey Clinic, Boston, who will address the Assembly on "Some Recent Advances in Surgery." In the impressive and colorful Convocation ceremonies which will take place Friday evening in the Auditorium Music Hall, 660 candidates will be admitted to membership in the College.

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References: (1) Loewe, L., Hirsch, E., Grayzel, D.M., and Kashdan, F. Experimental Study of the Comparative Action of Heparin and Dicumarol on the *In Vivo Clot*, *J. Lab. Clin. Med.*, 33 721, 1948.
(2) Evans, J. A., and Dee, J. F.: Anticoagulant Treatment of Postoperative Venous Thrombosis and Pulmonary Embolism, *New Eng. J. M.*, 238:1, 1948.

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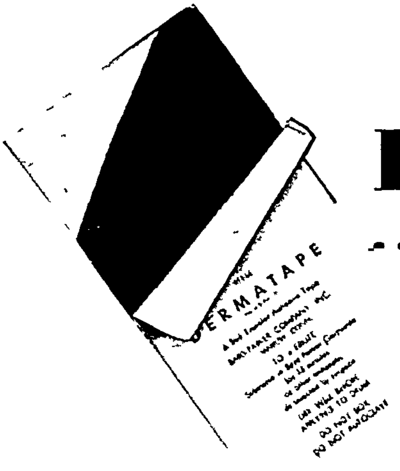

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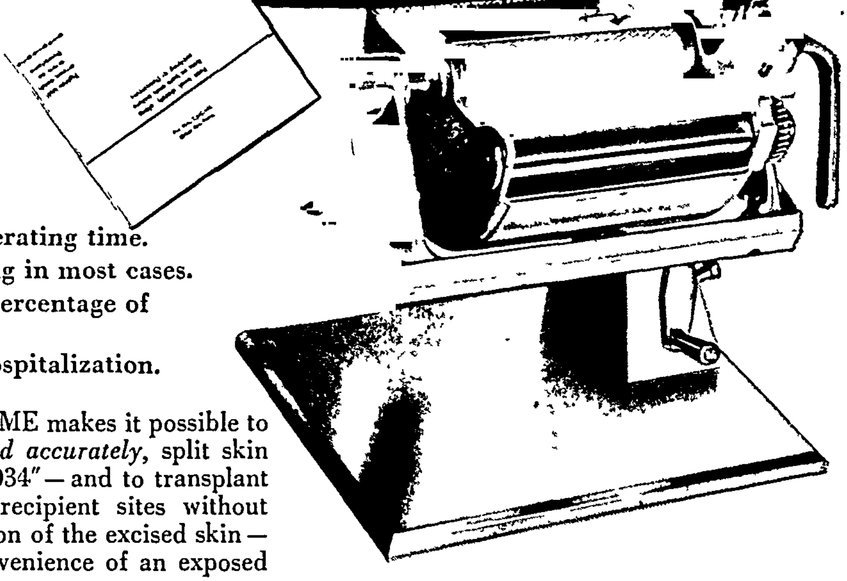

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The Journal of the International College of Surgeons

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Vol XIV SEPTEMBER, 1950 No 3

Original Articles

Homografts of Aorta Preserved in Alcohol

PROF DR R PAOLUCCI, F I C S (Hon), AND E TOSATTI, M D
ROME

THE problem of vasal grafts has been brought to the fore again by the most recent work of Gross and Pence and their collaborators. The problem is certainly not new, it was first approached in the latter half of the nineteenth century by Bert (1866), Gluck (1881) and Jaboulay (1896), was thoroughly explored at the beginning of the twentieth century by Alexis Carrel and his collaborators, reappeared repeatedly and was repeatedly abandoned during the period between the two world wars.

The various methods of conservation of the grafts (at low temperature in formalin solutions in autologous and homologous serum with the addition of antiseptics, "in a state of latent life" etc), which have now been reexamined with some variation by Gross and his colleagues had already been extensively investigated in the past by Carrel as well as by Guthrie and his collaborators. To the latter we owe the first observation, whereby, for practical purposes only autografts and homografts can be utilized with any hope of success.

Gross and Pence are to be credited for (1) first obtaining consistently favorable results with homografts of large arteries (aorta) in animals, (2) demonstrating the fundamental importance of the reaction of the medium for preservation of the grafts, (3) first succeeding with homografts of the large arteries in man, and (4) laying the foundation for the organization of "banks" of arteries.

Among the various methods employed by Gross and his collaborators, no doubt the best (see Pence) is that which consists of preservation of the segments in formalin and then washing in a special physiologic and antiseptic solution (although this too is but a modification of the technic of Carrel and Guthrie). Having been exhaustively studied by now, this method may be said to have met its purpose, even though it cannot be considered devoid of inconvenience. Indeed in spite of most thorough washings a certain amount of formalin always remains in the pieces that have been impregnated and its presence in the grafted tissues may not be altogether harmless. The physiologic solutions used, besides being very complex require the addition of antiseptics the action which both in the graft and in its host cannot be considered negligible. The indispensable, repeated

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From the Surgical Clinic of the University, Rome, directed by Prof Dr R Paolucci di V
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control of the pH in formalin and physiologic solutions is not always easy; it involves a certain loss of time and can be carried out only by experts who can afford the necessary equipment and trained personnel.

In view of the foregoing considerations, we endeavored to find another medium of preservation for the grafts of the aorta in animals and to plan for possible organization in the future, also in this country, of an artery bank

Reluctant to assign to formalin and low temperatures the exclusive prerogative for preservation of so-called "latent life," and thinking it desirable to remain, for obvious reasons, in the field of "fixators," we decided that, having discarded formalin, it might be well to adopt its most important competitor in histologic practice; namely, alcohol.

Unexpectedly favorable results were obtained in preliminary tests in which the segments to be transplanted were preserved in pure alcohol kept purposely at room temperature. These results warranted a more thoroughgoing study of the literature on the subject. The search revealed that alcohol, though used only exceptionally and with a technic altogether different from ours, had already been tried for the specific purpose of preserving pieces of arteries and veins to be used in grafts and that in some cases (though rarely) it had given satisfactory results. As a matter of fact, in 1918 Nageotte and his collaborators successfully carried out in a dog a homograft of carotid kept for a certain period in a mixture of alcohol and ice. Blakemore and his collaborators in 1943 took up the old technic of Nageotte for the preservation of segments of vein to be transplanted.

However, the studies initiated by us differed from those just mentioned because we

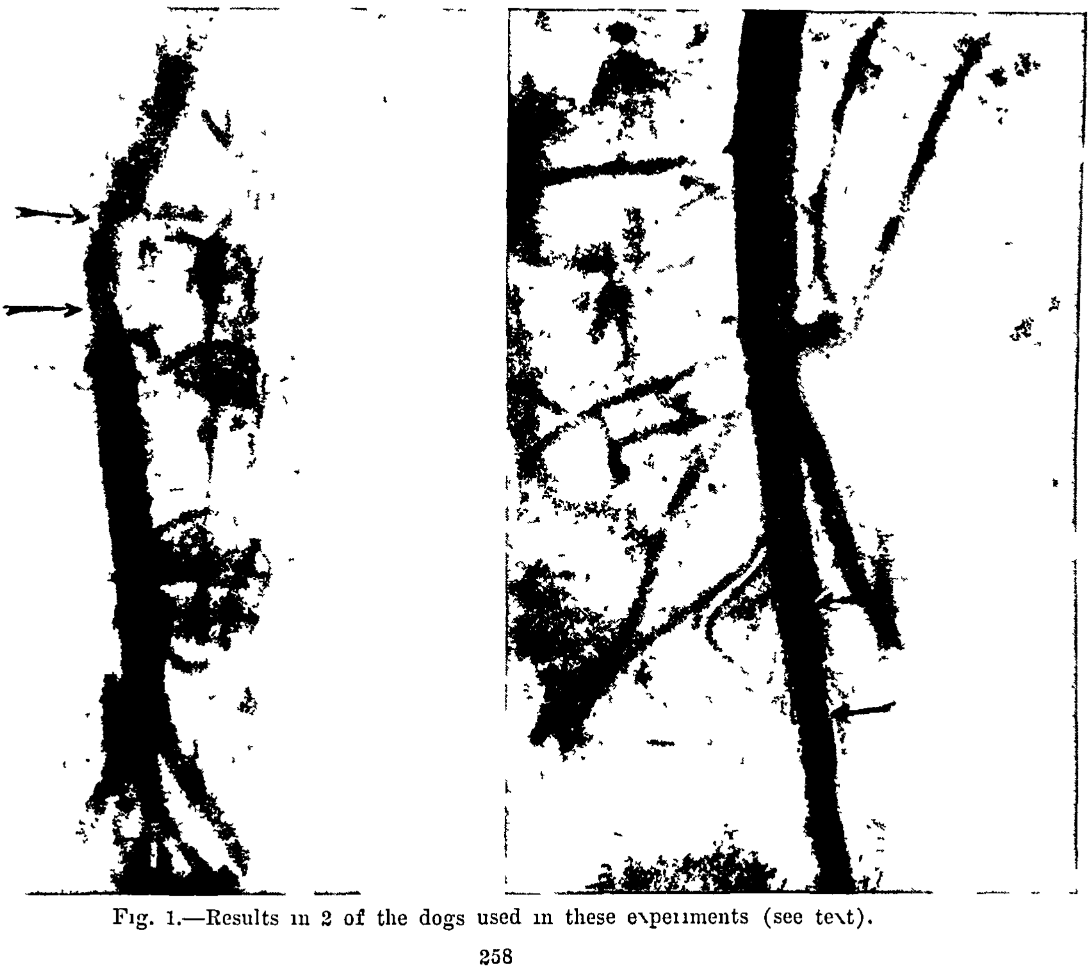

Fig. 1.—Results in 2 of the dogs used in these experiments (see text).

used grafts of the large arteries (aorta) and kept the pieces at the same temperature of the room and only in pure alcohol

Encouraged by the results of the aforementioned preliminary tests, we operated on 5 adult dogs averaging 20 Kg in weight Barbiturate anesthesia was used (evertent suture, nontraumatic needles Deknatel No 000000 silk) in the abdominal aorta (between the renal and the lower mesenteric artery) via lumbalis, after a preliminary two hour washing of the grafts in simple physiologic solution of sodium chloride The segments of aorta, 2 to 5 cm long (extracted without sterilization from other animals) had been kept in pure alcohol at room temperature for five to fifteen days

Results —Fifteen days after the operation the animals appeared in good condition, they took nourishment and walked in an apparently normal manner The femoral pulse was bilaterally well sustained in all instances One of the dogs died suddenly on the twenty-first day of thrombosis Dehiscence of the suture was noted (graft was kept in alcohol for fifteen days)

Roentgen Examination (4 dogs) Aortographic study was undertaken at intervals of one, two, three, four five, six seven, eight and nine months after the operation (Joduron 40 per cent, 10 cc in the right femoral artery There was no stenosis, no ectasia, full perviousness in all cases was observed In 2 dogs it was even difficult to recognize the point where the grafting had been made (Fig 1, *left* and *right*)

Macroscopic Examination (2 dogs killed respectively seven and eight months after the operation Coalescence of the graft with the tracts above and below the abdominal aorta was complete The grafted tract was covered by a connective enclosure which made it adhere at one point to the surrounding tissues The respective lines of the suture and the silk thread were nevertheless clearly visible There was ample previousness, there was no sign of stenosis thrombosis or protrusion (Fig 2)

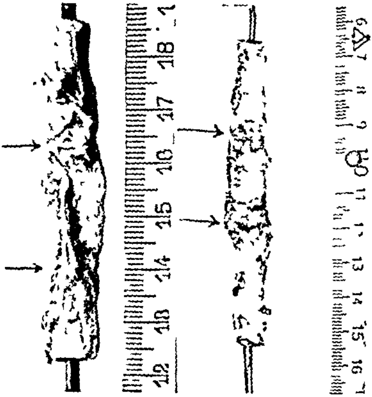

Fig 2 —Gross specimens from 2 dogs killed respectively seven and eight months after the operation

Microscopic Examination (2 dogs) The most notable points as to adherence of the homotransplant of aorta preserved in alcohol are as follows

1 While the graft is becoming enclosed in a thick covering originated by the connectival reaction of the external tunics of the guest segment (Fig 3 *a*), and that of the neighboring tissues, there begins, develops and comes to completion the coalescence of arterial surfaces (Fig 3, *a* and *c*) which are kept in contact by the suture aided in particular by cellular elements coming from the perivasal tissues, from the external tunics of the guest segment, and from the slight initial parietal thrombosis often manifest near the lines of the suture

2 The lymphatic spaces of the graft enlarge (Fig 3 *b*) and are invaded by cellular and capillary elements coming from the external tunics of the guest segment (Fig 3 *d*) from the perivasal connective tissue, from cellular masses which had gathered around the suture line, from the cellular enclosure which envelops the silk thread throughout its length and from the cellular elements to be found in the thin parietal thrombotic layer that initially covers the internal surface of the graftage

3 The thin veil of fibrin (in whose net few cellular elements are caught), deposited at first on the internal surface of the graft is covered by a little layer of endothelial cellules (Fig 3 *b*) coming from the guest segment,

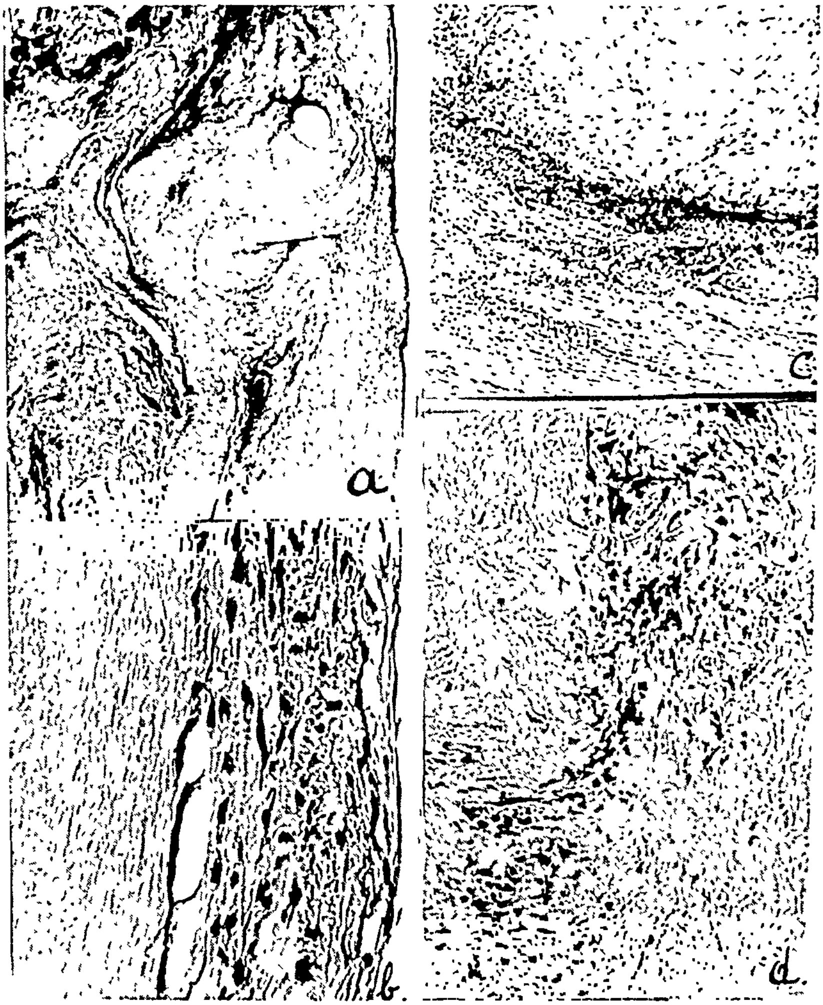

Fig. 3.—Microscopic results (see description in text).

which succeeds in going over the line of suture and tends to reach (if the graft is not too long) those coming from the other piece of aorta.

Conclusions.—This method of preservation in pure alcohol at room temperature (tested so far by only a small number of animal experiments) for preserving pieces of abdominal aorta 2 to 5 cm. in length to serve as grafts is, in our opinion, simpler than the one recently adopted by Gross and Peirce and their colleagues, at least under the specific test conditions (grafts preserved no longer than fifteen days). It has enabled us to obtain satisfactory results.

SUMMARY

The authors report satisfactory results from experimental homografts (dog) of tracts of aorta simply preserved in pure alcohol at room temperature for one to two weeks.

ZUSAMMENFASSUNG

Die Verfasser berichten ueber zufriedenstellende Ergebnisse in experimentellen Eigenverpflanzungen (am Hunde) von Teilen der Aorta, die einfach in reinem Alkohol bei Zimmertemperatur fuer ein oder zwei Wochen aufgehoben worden waren.

RIASSUNTO

L'A. riporta risultati favorevoli ottenuti nel cane con omotrapianti di aorta, conservati semplicemente in alcool, a temperatura ambiente, per 1 - 2 settimane.

RÉSUMÉ

Les auteurs rapportent les résultats satisfaisants obtenus par les homogreffons expérimentaux de parties de l'aorte conservée dans l'alcool pur, à la température de chambre, pour une ou deux semaines.

RESUMEN

Los autores comunican los resultados satisfactorios obtenidos con los homoinjertos (perros) de tracto de aorta simplemente preservada en alcohol, pero a la temperatura ambiente durante una o dos semanas.

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Great Moments in Science: The Phagocyte Theory

One day when the whole family had gone to the circus to see some extraordinary performing apes, I remained alone with my microscope, observing the life in the mobile cells of a transparent starfish larva, when a new thought suddenly flashed across my brain. It struck me that similar cells might serve in the defense of the organism against intruders. Feeling that there was something in this of surpassing interest, I felt so excited that I began striding up and down the room and even went to the seashore to collect my thoughts.

I said to myself that, if my supposition was true, a splinter introduced into the body of a starfish larva, devoid of blood vessels or of a nervous system, should soon be surrounded by mobile cells as is to be observed in a man who runs a splinter into his finger. This was no sooner said than done. There was a small garden to our dwelling, in which we had a few days previously organized a Christmas tree for the children on a little tangerine tree; I fetched from it a few rose thorns and introduced them at once under the skin of some beautiful starfish larvae as transparent as water.

I was too excited to sleep that night in the expectation of the result of my experiment, and very early the next morning I found that it had fully succeeded. That experiment formed the basis of the phagocyte theory, to the development of which I devoted the next twenty-five years of my life.—E. Metchnikoff

Congenital Obstructive Lesions of the Urinary Tract

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DEVELOPMENTAL processes that take place during the first few weeks of embryonic life provide ample opportunity for the formation of congenital anomalies of the urinary tract. In addition to anomalies in form, position, blood supply and structure, various parts of the urinary tract may be duplicated. Congenital obstructive lesions occur at the ureteropelvic and ureterovesical junctions, at the neck of the bladder, and occasionally in the body of the ureter and below the external vesical sphincter. The fundamental anatomic change produced by these obstructive anomalies is dilatation above the point of obstruction. Incident to obstruction are retention of urine, infection and varying degrees of reduced renal function. The formation of stones in this group of cases is not an uncommon complication. Congenital obstructions at the ureteropelvic junction are of three general types: first, high insertion of the ureter above the most dependent portion of the pelvis; second, a narrow ureteropelvic junction; and third, aberrant blood vessels running across to the lower pole of the kidney and compressing the ureteropelvic junction. Congenital bands may also involve this area. A combination of these anomalies may occur in a single case. Obstruction at the ureteropelvic junction of clinical importance is occasionally encountered in children. In the majority of cases, however, abnormal changes in the kidney are not serious enough to produce symptoms before young adult life.

Pain in the renal area, chills and fever, and persistent urinary infection are the usual symptoms that lead to investigation. Examination should establish whether the obstruction is unilateral or bilateral, the degree of renal damage and other complicating factors. If it is unilateral and if the affected kidney retains 25 per cent or more of function, plastic reconstruction of the ureteropelvic junction should be done; if an adequate opening is obtained, a kidney of functional value will be preserved. If the affected kidney has less than 25 per cent of function, the other kidney has usually undergone some degree of compensatory hypertrophy and nephrectomy may be required. The final decision, however, cannot always be made until the kidney is exposed. It should be emphasized that if there is any doubt as to the proper procedure the decision should be made on the conservative side. Nephrectomy at a later date is obviously preferable to primary removal of a kidney that may regain some degree of function.

The methods by which anomalies at the ureteropelvic junction can be reconstructed are numerous and have been fully described in the literature. No single procedure can be applied in all cases. It is often necessary to combine two or more methods in order to meet requirements in an individual case.

The following brief case reports illustrate the common types of anomalies at the ureteropelvic junction and the results that can be obtained by plastic repair.

CASE 1. A 28-year-old woman consulted this service because of recurrent colicky pain in the right flank, associated with nausea and vomiting. Examination showed a normal urinary tract on the right, but on the left there were high insertion of the ureter above the most dependent portion of the renal pelvis, apparent obstruction at the ureteropelvic junction and secondary hydronephrosis. At operation, in addition to the high insertion of the ureter, aberrant vessels could be seen running across the ureteropelvic junction. These were removed, unilateral repair of the Mikulicz type was carried out, and a portion of the redundant pelvis was resected. Postoperative roentgenograms showed the ureter coming off at the most dependent portion of the pelvis, with an adequate opening at the ureteropelvic junction.

CASE 2. An 18-year-old woman complained of recurrent attacks of pain in the left side, associated with chills and fever. Examination showed pro-

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nounced hydronephrosis on the left side, with apparent narrowing of the ureteropelvic junction. At operation, in addition to the narrow junction, an aberrant vessel could be seen running across and compressing the ureteropelvic junction. It was removed, and bilateral repair of the Mikulicz type was carried out. The immediate postoperative roentgenograms showed an extremely satisfactory result, and the patient has remained well up to the time of writing, six years after the operation.

CASE 3. A 26-year-old woman complained of pain in the right side, hematuria, frequent urination and burning. Examination revealed a large, infected, hydronephrotic right kidney. Although function in this kidney was greatly reduced, it was still within the limits of one that might be worth saving. Operation revealed a somewhat thin but otherwise good cortex, an extremely large, redundant extrarenal pelvis, aberrant vessels running across and compressing the ureteropelvic junction, and severe constriction of the ureter in this area. The vessels were removed, a plastic procedure of the Y type was performed and the redundant portion of the pelvis was resected. Immediate postoperative roentgenograms disclosed adequate repair, and intravenous urograms at the end of the third postoperative month showed almost complete restoration of function.

In the management of renal stones it should be borne in mind that a minor obstruction at the ureteropelvic junction may be the primary lesion, the stone being secondary to stasis and infection. The following case illustrates this point.

CASE 4. A 26-year-old woman complained of pain in the right side, recurrent attacks of chills and fever and multiple renal ureteral stones. The latter diagnosis had been made by her family physician. Examination showed a normal urinary tract on the left and multiple stones in the right kidney and ureter. There was no concentration of the dye after intravenous administration of diodrast, and cystoscopic study disclosed no appearance of indigo from the right ureteral orifice. It was decided to perform nephrectomy, but at operation the color and consistency of the cortex could be seen to be good. The renal pelvis was large and dilated, and the ureteropelvic junction was narrow. In addition to an aberrant blood vessel, there were two stones in the ureter, producing almost complete obstruction; this accounted for the absence of concentration of the dye by the right kidney at the time of examination. The stones were removed from the kidney and ureter, the aberrant vessel was cut and a Y plasty was done on the ureteropelvic junction, together with resection of the redundant portion of the pelvis. The immediate postoperative roentgenograms were satisfactory, and intravenous urograms at the end of three months showed approximately 75 per cent return of function. This case emphasizes the importance of conservatism in dealing with young persons.

To remove stones in such cases without reconstructing the ureteropelvic junction will not result in complete relief of symptoms. The patients continue to have renal pain, and urinary infection persists as is illustrated by Case 5.

CASE 5. A 36-year-old man had had a stone removed from the right renal pelvis while in military service in 1942. A deformity at the ureteropelvic junction was recognized at that time but not repaired. The patient continued to have renal pain. At operation performed in June 1948, in addition to a small aberrant blood vessel, constriction of the ureteropelvic junction was observed. Bilateral Mikulicz repair was done, with an excellent functional result. Intravenous urograms taken three months later showed an adequate opening at the ureteropelvic junction. The patient has continued to be entirely free of pain.

In the treatment of bilateral obstructions at the ureteropelvic junction, the side with the greater amount of renal damage should be operated upon first and the other side should be treated without unusual delay, preferably within the next three months. Once the obstruction on one side is relieved, the function in the opposite kidney fails at a more rapid rate, and the kidney will eventually become a functionless, hydronephrotic or pyonephrotic sac. The following case illustrates this point.

CASE 6. A 24-year-old woman had been examined in another medical center at the age of 20. At that time bilateral obstruction at the ureteropelvic junction was noted; the left kidney, which showed the poorer function, was repaired, and the patient was asked to return three months later for repair of the opposite side. When examined here, four years later, the right kidney was nothing more than a pyonephrotic sac, and nephrectomy was required.

Congenital lesions at the ureterovesical junction are of two types. The first type consists of narrowing of the ureteral orifice involving the mucosa only, which results in an intravesical cyst of the ureter or ureterocele. It is recognized on cystoscopic examination as a translucent urine-filled cyst. It may attain a large size and interfere with urination by blocking the internal vesical orifice. Occasionally, in the female, it may extrude through the urethra. Usually it can be successfully treated by transurethral resection of the mucosal wall of the cyst. Occasionally, in a child with a small urethra and especially if the ureterocele is large, suprapubic excision may be necessary.

An example of this type was observed in a girl aged 17 months, who was admitted to the hospital because of chills and fever, pain in the right side and recurrent attacks of acute retention. Examination revealed a large right ureterocele, which was removed by suprapubic excision with an excellent result.

The other type is a narrowing of the entire intramural portion of the ureter. This type, in our experience, has been encountered chiefly in young children, is most often bilateral and is usually associated with pronounced dilatation of the upper portion of the urinary tract.

An example of this type is the case of a girl aged 6 months who was admitted to the hospital for repair of a harelip and cleft palate. On the basis of the fact that one congenital anomaly is often associated with another, routine studies of the urinary tract were done. Bilateral congenital strictures of the intramural portion of the ureters with pronounced dilatation of the upper urinary tract were observed. The degree of damage in the upper urinary tract in this case emphasizes the importance of complete examination of children with congenital anomalies.

There are three methods by which narrowing of the entire intramural portion of the ureter can be treated. For the first method, cystoscopic ureteral dilation, general anesthesia is required. The urethra of a small child will not, as a rule, accommodate instruments of sufficient size to make any real impression upon the obstruction, and treatment has to be given at too frequent intervals to be practical. This method, in our opinion, is unsatisfactory. A second method consists in freeing the bladder posteriorly, exposing the ureters at their entrance into the bladder wall, severing them at this point and reimplanting them into the bladder. A third method, ureteral meatotomy, may be done transurethrally with a Campbell type of ureteral electromeatome if the child's urethra is of sufficient size to accommodate an operating type of child's cystoscope. In cases in which transurethral ureteral meatotomy cannot be performed, suprapubic cystostomy should be done. An incision is made from the orifice through the strictured area and the ureteral mucosa is sutured to the bladder mucosa, after which ureteral catheters are left in place for five to seven days. This method is less formidable than reimplantation of the ureters and in our hands has been quite satisfactory.

Duplication is one of the commonest anomalies of the upper part of the urinary tract. If the ureters open in the normal position at the lateral angle of the trigone, the anomaly is of no clinical importance. If, on the other hand, the orifice of a duplicated ureter is constricted, changes of clinical significance take place in the corresponding portion of the kidney.

An example of this is the case of a 24-year-old woman who complained of pain in the right side and chills and fever of long duration. As a result of the first attack the appendix was removed; because of the second attack, cholecystectomy was done, and at a third operation the common bile duct was explored. The urinary tract was examined for the first time after this last episode. Thorough investigation revealed normal conditions on the left side with complete duplication of the pelvis and ureter on the right side, congenital stricture of the orifice of one of the duplicated ureters and hydronephrosis of the corresponding portion of the kidney. This case emphasizes the importance of investigating the urinary tract in cases in which there is some doubt as to the diagnosis.

A duplicated ureter may open in an abnormal position, e.g., in the rectum, in the vagina or in some portion of the urethra. Drainage in such cases is practically always deficient, and dilatation above the point of obstruction is usually observed.

An illustration of this is the case of a 26-year-old woman who complained of lifelong annoyance due to dribbling of urine. She also passed normal volumes of urine at normal intervals. Examination showed a duplicated pelvis and upper ureter on the right side and complete duplication of the urinary tract on the left with the ureter from the upper half of the kidney *opening at the external urethral* orifice The other ureters opened into normal positions at the lateral angles of the trigone Although this patient was attractive intelligent and a college graduate she had never become interested in having the dribbling corrected until she contemplated marriage

Her condition lent itself well to a conservative type of operative procedure The upper pole of the kidney was resected the dilated ureter was removed and enough renal tissue was preserved on this side to be of some functional value

Congenital obstructions at the neck of the bladder are due to congenital valves in the posterior portion of the urethra elevation of the posterior internal sphincteric area simulating a median bar in adults contracture of the internal vesical orifice and rarely congenital hypertrophy of the prostatic lobes The symptoms are frequency difficulty in urinating straining to urinate and occasionally acute retention of urine There is early and progressive dilatation of the urinary tract The residual urine predisposes to infection and infection once it occurs is persistent and increases the rapidity with which renal function is destroyed The importance of early recognition of obstruction at the vesical neck in children is emphasized by the following cases

CASE 7 A 4 year old girl was brought to us for examination because of frequency burning chills fever and overflow incontinence Complete study of the urinary tract showed contracture of the internal vesical orifice and a severely dilated bladder with a reflux in a dilated left ureter There was congenital absence of the right kidney

CASE 8 A boy aged 19 months was referred from the *Pediatric Department because of diffi*culty in passing urine in addition to chills fever and drowsiness Complete study of the urinary tract showed a fairly marked congenital bar, considerable retention severe infection of the urinary tract and a dilated bladder There was also a reduction in renal function

CASE 9 A boy aged 2 years and 3 months was admitted to the Pediatric Service in coma His history was rather typical of that frequently obtained During infancy his grandmother noticed that he urinated frequently and passed an extremely small stream and urination was associated with a great deal of straining The difficulty was attributed to a long foreskin and circumcision was performed When the child was 16 months old the urine became infected and since then he had *had persistent infection* with recurrent chills and fever The combination of obstruction and infection accounted for the moribund state in which he *was admitted to the hospital Cystograms gave* a complete outline of a severely dilated and completely decompensated urinary tract

Congenital obstruction of the vesical neck may be relieved by transurethral resection suprapubic excision of the obstruction and in a selected group of male patients removal of the obstructing tissue under direct vision through a *modified retropubic approach to* the prostatic urethra For a patient with a small urethra that would be subjected to excessive trauma by transurethral instrumentation open operation should be done Patients in whom renal function is severely damaged and prolonged drainage is desirable should be treated by open excision of the obstruction and the suprapubic cystostomy tube should be left in until the urinary tract has become stabilized This may require six months to a year The retropubic approach is direct and for the males is probably the method of choice A longitudinal incision made in the prostatic capsule and carried through the bladder neck exposes the entire prostatic urethra and insures easy removal of the obstruction Bleeding *is controlled under direct vision* The wound is closed tightly and drainage is provided by a urethral retention catheter

SUMMARY

Various types of congenital obstruction of the urinary tract are discussed each being illustrated by means of one or more case reports Suggestions are made as to diagnosis treatment and the results to be expected The author s surgical technics for different congenital obstructive lesions are explained

RESUME

L auteur discute differents types d obstructions congenitales des voies urinaires Chaque type est illustre par le rapport de un ou plusieurs cas Des suggestions sont faites sur le diagnostic sur le traitement et sur les resultats qu on peut esperer La technique chirurgicale de l auteur pour les differentes lesions obstructives congenitales est expliquee

RIASSUNTO

Descrive vari tipi di ostruzioni congenite delle vie urinarie, illustrando uno o piu' casi per ogni varieta'. Dopo avere discusso i problemi diagnostici e terapeutici, l'A. illustra la propria tecnica operativa per le diverse varieta' di ostruzioni congenite.

RESUMEN

El autor estudia los varios tipos de obstrucción congénita del tracto urinario, ilustrando cada uno de ellos con uno o más casos. Hace algunas sugerencias en cuanto al diagnóstico, tratamiento, y los resultados que pueden esperarse, explicando sus técnicas para las diferentes lesiones obstructivas congénitas.

ZUSAMMENFASSUNG

Verfasser eroertert verschiedene Arten von angeborenem Verschluss des Harnsystems und erlaeutert jede einzelne Form an Hand eines oder mehrerer Krankheitsberichte. Es werden Anregungen hinsichtlich der Diagnose, der Behandlung und der zu erwartenden Ergebnisse gegeben. Die chirurgische Technik des Verfassers bei verschiedenen angeborenen obstruktiven Veraenderungen wird erklaert.

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Esophagoduodenal Anastomosis in Selected Cases of Total Gastrectomy

LOUIS T PALUMBO, M D, F A C S, F I C S*
DES MOINES, IOWA

MANY recent articles have completely covered the subject of total gastrectomy as to indications, technics, pathologic picture and mortality and curability rates This presentation, therefore, is limited to a certain phase of operative technic which appears feasible in selected cases of total gastrectomy

The type of esophagoduodenal anastomosis to be described has not received great recognition, and little attention has been given it for years The first successful operation of this type was performed by Brigham[1] in 1898 In the literature since that time, reference has been made to it by a few surgeons[2] In a collected series up to 1942 the operative mortality and results were comparable to those reported for esophagojejunostomy, at the time of publication the mortality rate was about 33 per cent[2a] Since 1942 the operative mortality for total gastrectomy with esophagojejunostomy has improved and is reported as ranging from 10 to 31 per cent[3]

In 1948 Priestley[2c] reported 2 successful cases of total gastrectomy with esophagoduodenostomy In reviewing the literature it becomes apparent that esophagoduodenostomy has been performed occasionally since 1930 In many of the larger surgical centers, where considerable experience has been attained with total gastrectomy, this operative method apparently has not been used

Within the past few years it has appeared that a safe and easy anastomosis of this type could be accomplished In these cases the local pathologic process and the proximity of the mobile duodenum were such that the cut end of the esophagus and the duodenum could be approximated without tension, which resulted in a safe and satisfactory anastomosis

Technic —The incision used is individualized, depending on the physical stature of the patient and the expected extent of the lesion In 2 of the cases presented the operation was accomplished through a subdiaphragmatic approach; a transverse supra-umbilical elliptic incision was employed, which transsected the anterior and posterior rectus sheaths and the rectus abdominus muscles In the third case, because of a large chest and a high diaphragm, a small left subcostal incision was made, which was then carried across the costal arch, dividing the eighth intercostal space and sectioning the diaphram In the fourth and fifth cases, because of the size of the lesion and direct extension to adjoining viscera, the same type of exposure was made, however, in the fifth case the seventh intercostal space was divided This transabdominal thoracic exposure was entirely adequate and simplified the whole operative procedure

Mobilization of the stomach for total gastrectomy is carried out in the usual manner The distal end of the stomach is transected at the pyloric ring It is suggested that a rubber shod clamp be placed across the duodenum below the site of the intended anastomosis (Fig 1) and that a crushing clamp should not be used on the divided distal end, lest injury to the tissues be produced and increase the hazard of delayed union or leakage of the anastomosis because of necrosis The stomach and the associated lesion can then be removed by dividing the stomach at the esophagocardial junction, or the stomach can be displaced upward and to the left and be used for traction while the posterior anastomosis is accomplished between the esophagus and the duodenum In either case the esophagus can be mobilized by blunt dissection if one enlarges the esophageal hiatus and brings down about 2 inches (5 cm) of esophagus from the thorax, if the thorax is not opened If the combined abdominothoracic approach is utilized the esophagus is readily

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*Chief of Surgical Service Veterans Administration Hospital Des Moines

From the Department of Surgery

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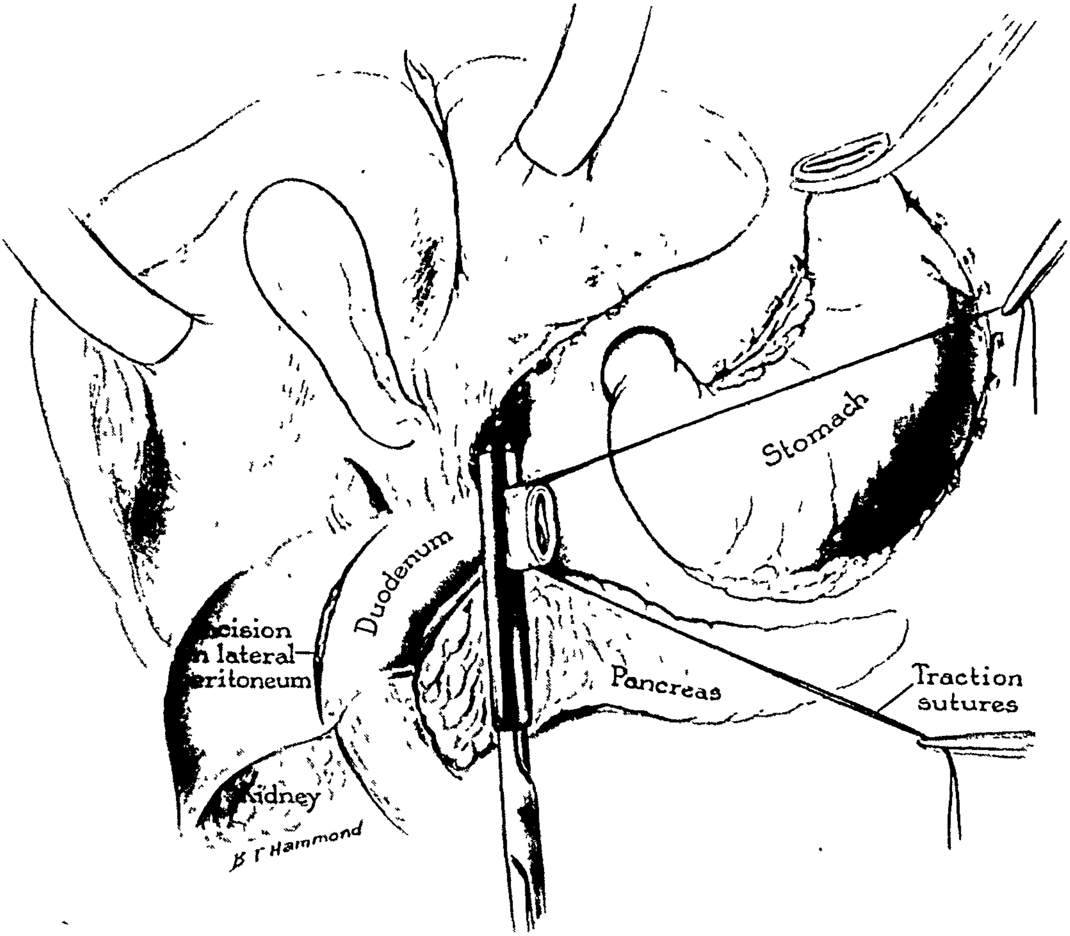


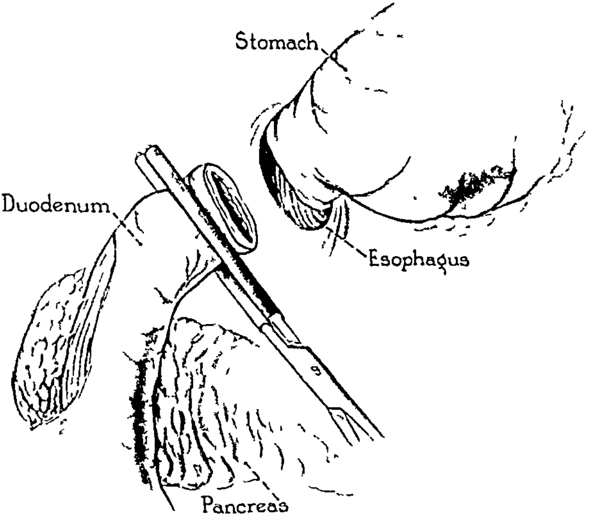
Fig. 1.—Esophagoduodenostomy. The stomach is completely mobilized for total gastrectomy, transected at the pylorus and displaced upward and to the left, exposing the esophagus, to which it is still attached. The duodenum is clamped with a rubber-shod clamp beyond the intended site of anastomosis. The lateral peritoneal reflection is divided to increase mobility of the duodenum.

visible, easily mobilized and in a direct position for anastomosis. If the stomach is removed prior to the anastomosis, several traction sutures of No. 00 silk are placed in the wall of the esophagus and above the intended site of anastomosis. These are used to prevent the esophagus from retracting into the chest.

I prefer to use an open method of anastomosis (Figs. 1 to 5 inclusive) and to avoid placing clamps of any type across the stump of either the duodenum or the esophagus.

After mobilization of these structures, the end of the duodenum is approximated to the esophagus to determine whether it will lie in this position without tension (Fig. 2). If such is the case, the anastomosis is carried out. If there appears to be any tension, this anastomosis should be abandoned; the duodenal

Fig. 2.—Second stage of esophagoduodenostomy. *Above,* the duodenum is fully mobilized (to provide approach to the stomach without tension) and anchored to the pancreas with interrupted sutures. *Below,* the first layer of interrupted No. 000 silk sutures is introduced on the wall of the esophagus and the duodenum.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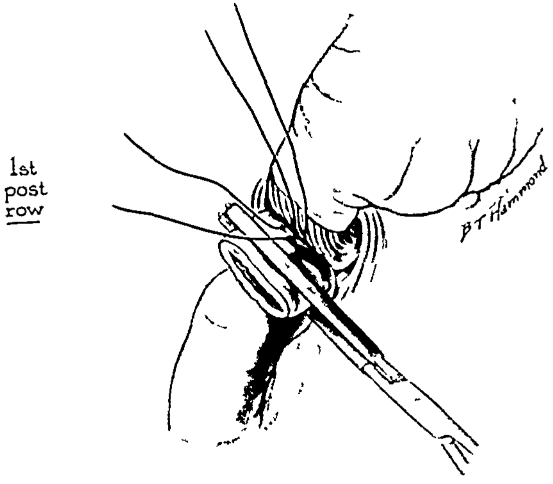
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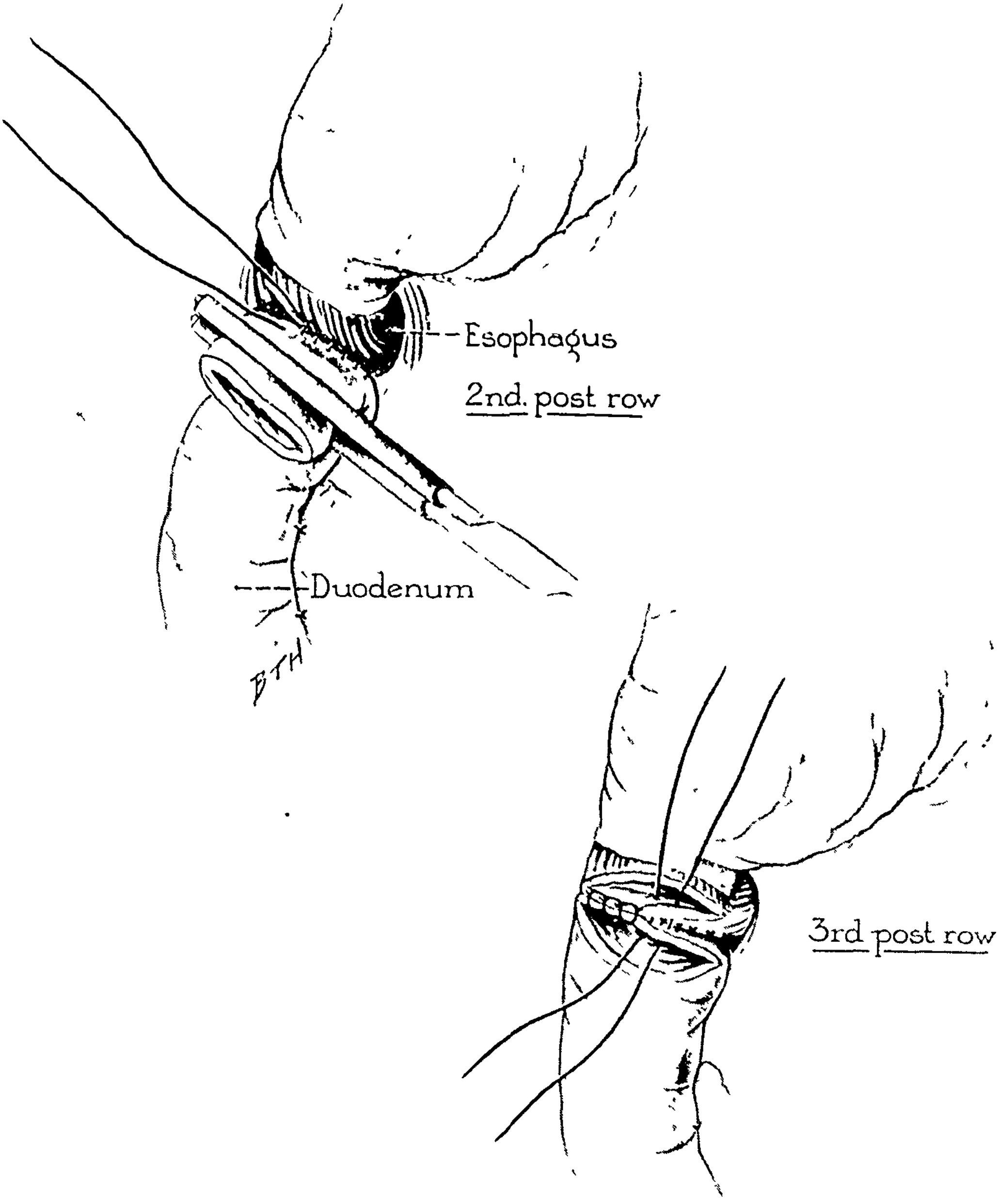

Fig. 3.—Completion of the second and third rows of sutures posteriorly. *Above,* second row of No. 000 silk; *below,* interrupted row of No. 000 silk placed in the posterior mucosal layer of the duodenum and the esophagus.

stump should be closed and an esophagojejunostomy peformed.

In all cases here presented, either a two-row or a three-row suture technic was used, with sutures of atraumatic No. 000 silk (Figs. 2, 3 and 4). The first row sutures the posterior muscular wall of the esophagus to the posterior seromuscular wall of the duodenum (Fig. 2). The second row reinforces the first, and the third consists of interrupted sutures approximating the posterior mucosal layer of the esophagus to that of the duodenum (Fig 3) The posterior row is placed first from the seromuscular layer to the mucosal layer which is the last of the *posterior* sutures to be taken The Levine tube is next passed into the duodenum beyond the anastomosis The anterior sutures (Fig 4) are then taken the procedure is the same as that used posteriorly, except that approximation of the mucosal layers is done first, followed by the second layer and then finally the third layer of the seromuscular layer of the duodenum to the muscular layer of the esophagus The duodenum is then anchored to the adjoining peritoneum (Fig 2) with interrupted silk or catgut to main

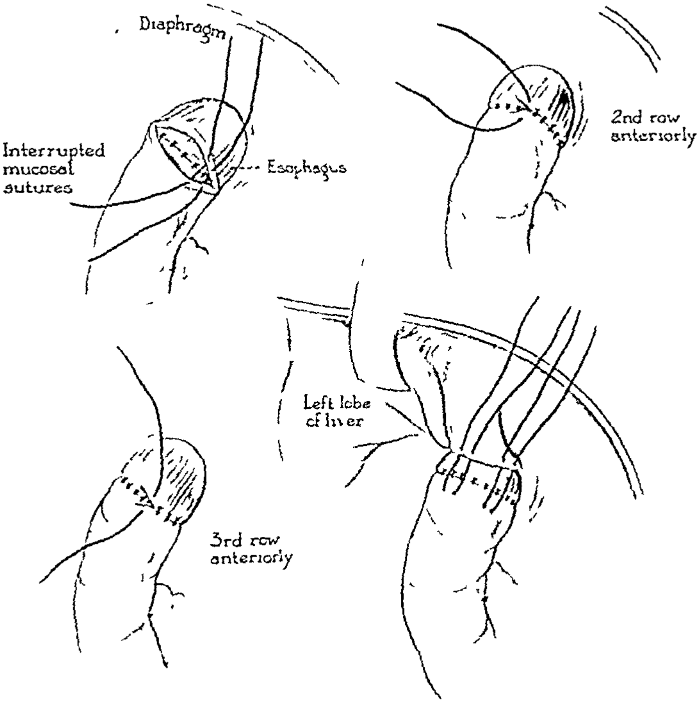

Fig 4—Completion of the anastomosis anteriorly *Upper left*, interrupted No 000 silk sutures in the mucosal layer *upper right* second row of interrupted sutures of the same size, *lower left*, third row of interrupted silk sutures *Lower right* suturing of the left triangular ligament of the left hepatic lobe over the site of anastomosis

tain it and the pancreas in this new position and thus prevent traction on the suture line.

In some cases the divided round ligament or the left triangular ligament of the liver (Fig. 4) can be sutured to the site of the anastomosis. The use of an interrupted suture technic throughout for the anastomosis appears warranted, as it probably involves less chance of stenosis of the stoma and necrosis of the mucosa. The anastomotic site is usually buttressed against the crus of the diaphragm behind and anteriorly to the newly formed hiatus of the diaphragm, interrupted No. 00 or No. 000 silk sutures being employed. This aids in anchoring and protecting the anastomosis from leakage. At completion of the operation the duodenum lies usually to the left of the midline and presents a straight appearance rather than its normal C-curve (Fig. 5).

It is suggested that in some cases a portion of the prepyloric area, along the greater curvature of the stomach and/or a small portion of the fundus near the cardioesophageal opening, may be preserved without decreasing the curability rate. This will provide sufficient cuff to form a small tube for a simpler and more satisfactory anastomosis without tension. These two methods have been utilized in 2 other cases, with very satisfactory results.

REPORT OF CASES

CASE 1.—A 57-year-old white man was admitted to the medical service on June 12, 1947, with a history of epigastric pains for the past six months, associated with nausea, vomiting, hematemesis and tarry stools. He had lost 30 pounds (13.6 Kg.) in weight during this period. Physical examination gave negative results except for left subcostal tenderness. A roentgenogram of the stomach (Fig. 6*A*) revealed a persistent filling defect high on the posterior wall. Laboratory studies revealed values within normal limits. A gastric analysis was not performed because of recent hemorrhage.

On June 26, surgical exploration revealed a large, firm tumor mass on the posterior wall of the lesser curvature, near the cardia. The mass measured 4 by 3 by 1 inches (10 by 7.5 by 1 cm.). Several enlarged soft lymph nodes were observed in the gastrohepatic ligament and along the left gastric artery. Frozen section studies of these distant nodes showed no evidence of malignancy. The lesion was considered operable; it required total gastrectomy and splenectomy. Since the duodenum was easily mobilized and no portion of the esophagus was sacrificed, an esophagoduodenostomy was performed without any difficulty. The pathologic diagnosis was scirrhous carcinoma of the stomach with metastasis to the mesentery and the regional lymph nodes.

The postoperative course was uneventful except for the development of a fistulous tract between the site of the anastomosis and the abdominal wall where the drains had been placed. This tract persisted for seven months but finally healed. In the abdominal incision a small draining sinus developed, which finally healed after excision of the silk that had been used in closure of the incision.

The patient has been reexamined on four occasions since the operation. His most recent examination took place on Jan. 4, 1949, at which time he showed increase in weight and a fair appetite; he stated that he tired easily (he was employed in a "hobby" wood shop). There was no evidence of metastasis, either local or distant. (On a previous admission the red count had shown secondary anemia.) The roentgenograms (Fig. 6*B*) showed an anastomosis of good function and a normal small bowel transit time.

CASE 2.—A white man 48 years old was admitted to the hospital on Dec. 24, 1947, with a twelve year history of gastrointestinal distress characterized by epigastric pain radiating to the back and vomiting of blood. He had a severe hemorrhage in 1939 and again in 1945. One week prior to admission he vomited a considerable amount of blood and passed tarry stools. He had had many years' treatment by diet for chronic duodenal ulcer. The history did not indicate alcoholism.

Physical examination gave essentially negative results. Roentgenograms (Fig. 7) of the stomach revealed a filling defect near the esophageal opening on the side of the lesser curvature and a markedly narrowed and extremely tender area involving the fundus and pars media.

On Jan. 2, 1948, the abdomen was explored. A scarred area was noticeable on the anterior aspect of the first part of the duodenum. The duodenum was freely movable. The upper four-fifths of the stomach was markedly thickened and firm, especially along the greater curvature in the fundic area and along the lesser curvature side near the esophagus. The mucosa in this area was hypertrophied and granular and bled easily. There was a depressed ulcer about 1½ inch (3.7 cm.) in diameter along the lesser curvature, 1 inch (2.5 cm.) below the esophageal opening. The ulcer had penetrated into the left lobe of the liver. There was an ulcer almost 1 inch (2.5 cm.) in diameter in the fundus on the greater curvature.

The lesion was considered malignant and was associated with hypertrophic gastritis, so a total

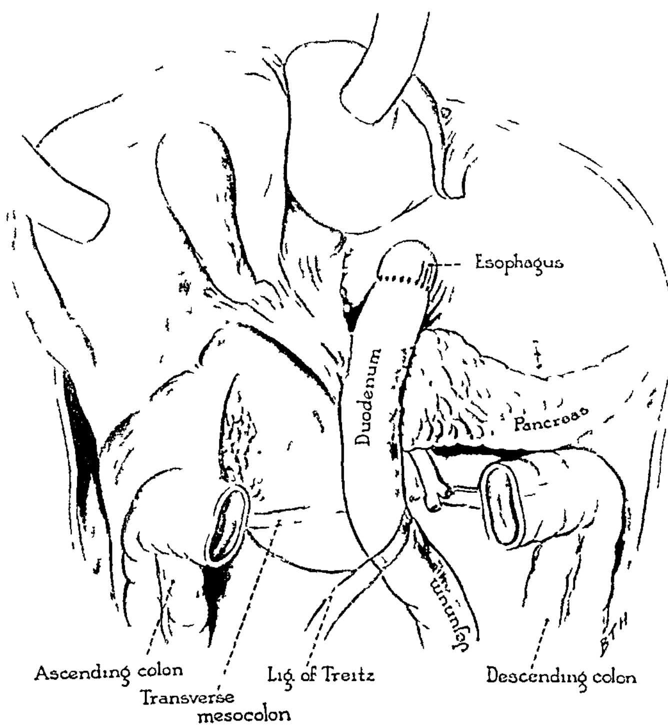

Fig. 5.—Completion of esophagoduodenal anastomosis. The duodenum lies to the left of the midline and no longer has its normal C curve.

gastrectomy and resection of a portion of the left lobe of the liver together with the adjoining lesser and greater omentum and lymph nodes were performed. The duodenum was mobilized, and with the aid of a small section of the greater curvature of the stomach (pyloric region) an anastomosis was made between the esophagus and the duodenal gastric stump. The pathologic diagnosis was adenocarcinoma in multiple areas of the stomach with extension to the liver, metastasis to regional lymph nodes and hypertrophic gastritis.

The postoperative course was uneventful until the fourth day, when sudden severe pain developed in the right side of the chest. Roentgenograms revealed bilateral pleural effusion, more marked on the right. The accumulation increased, and signs of pulmonary edema developed. On January 8, the sixth postoperative day, while a right thoracentesis was being performed and after withdrawal of 200 cc. of straw-colored fluid the patient suddenly stopped breathing. All measures for restitution were taken, but with no benefit.

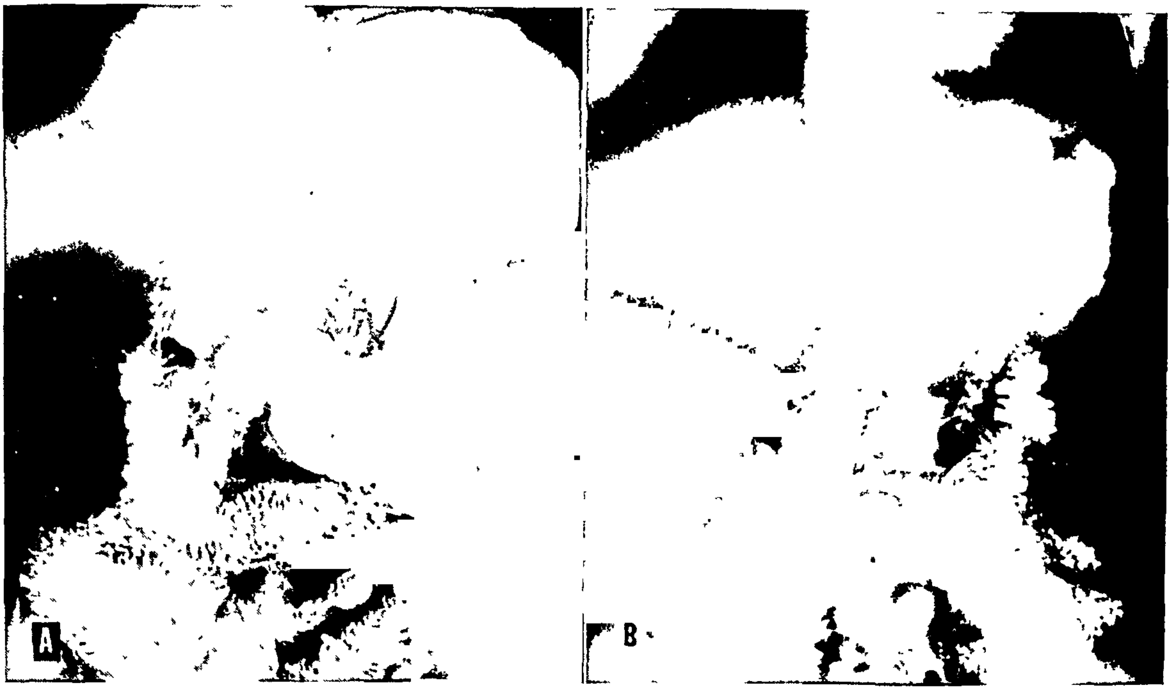

Fig. 6 (Case 1).—*A*, persistent constant irregular indentation on the greater curvature of the pars media. *B*, normally functioning anastomosis with no evidence of esophageal obstruction. The barium enters the duodenum readily, and the transit time for the small bowel is normal (column of barium in terminal portion of ileum in four hours).

Autopsy revealed bilateral pulmonary edema, atelectasis of the lower lobe of the right lung, right fibrinous pleurisy, nephrosclerosis, and cysts of the kidneys and passive congestion of the liver. The site of the anastomosis showed definite and satisfactory healing. The anastomotic stoma was adequate and admitted a finger without difficulty.

Case 3.—A white man 54 years of age was admitted to the hospital on Oct. 20, 1948, with a history of gastrointestinal distress of three months' duration. In August, while at work as a carpenter, he became weak, vomited about a quart of bright red blood and fainted. He passed tarry stools for a few days. Later there was pain in the left upper abdominal quadrant. His appetite became poor, and he lost 25 pounds (11.3 Kg.) in weight.

Physical examination gave negative results except for definite tenderness beneath the left subcostal arch. The laboratory data were normal except for the blood count, which showed 2,333,000 red blood cells per cubic millimeter and 20,700 white blood cells, with 85 per cent polymorphonuclears.

Roentgenograms (Fig. 8*A*) revealed a persistent filling defect and a large niche along the lesser curvature of the stomach near the cardiac orifice. The gastroscope confirmed the results of roentgen examination.

On November 19 a small left subcostal incision was made and the abdomen was explored. A large mass occupied the lesser curvature, extending from about 1 inch (2.5 cm.) below the esophageal opening down toward the pylorus. The mass was firm, with a large central depression representing a penetrating ulcer; the crater musured 1½ inches (3.7 cm.) in diameter and the same in depth. The ulcer had penetrated into the body of the pancreas. The lesion was considered malignant and operable, so the abdominal incision was extended upward across the costal arch, dividing the eighth intercostal space. This opened the left pleural cavity, and the diaphragm was divided down through the esophageal hiatus. Total gastrectomy and splenectomy were performed. The duodenum was mobilized, and an anastomosis was made between the cut end of the esophagus and the duodenum. The pathologist's report identified the lesion as a chronic penetrating gastric ulcer.

The postoperative course was complicated by a persistent draining sinus after the drains were removed. This tract did not communicate with the anastomosis or the small bowel. A left pleural effusion developed which did not require aspiration, there also developed a small subphrenic abscess, which was drained. After several months the sinus tract healed. The patient gained weight and strength. Roentgenograms (Fig 8B) showed an anastomosis of good function.

CASE 4.—A white man 53 years of age was admitted to the hospital on Dec 31, 1949, with a history of pain in the left upper abdominal quadrant and indigestion of one year's duration. An exploratory laparotomy had been done at another hospital, with negative results. The patient began to lose weight and continued to have pain in the area aforementioned. In June 1949 he had a sudden painless massive hematemesis that required several transfusions. He continued to lose weight and strength.

Examination on admission gave negative results except for tenderness in the left upper abdominal quadrant. The laboratory data were normal except for secondary anemia.

Roentgenograms (Fig 9A) revealed a large polypoid filling defect occupying the greater portion of the fundus and cardia of the stomach. *Gastroscopic observations confirmed the results of the roentgen examination.*

On Jan 19, 1950, a small left subcostal incision was made and the abdomen was explored. A large, *firm, irregular mass* was observed on the posterior wall of the stomach, involving the fundus and the cardiac region. The mass measured about 8 by 6 by 3 inches (20 by 12.5 by 7.5 cm) and was attached to the spleen, the left lobe of the liver, the body of the pancreas, *the left adrenal gland* and the transverse colon. The lesion was considered operable, so the abdominal incision was extended upward across the costal arch, dividing the eighth intercostal space. This incision permitted wide and adequate exposure of the upper part of the abdomen and the left pleural space. The diaphragm was divided medially downward through the esophageal hiatus. Total gastrectomy, splenectomy, partial pancreatectomy, *and partial resection of* the left lobe of the liver, the left adrenal gland, the greater omentum, the left half of the transverse colon and a portion of descending colon were performed. An end to end anastomosis of the colon was accomplished. The duodenum was adequately mobilized by dividing the right lateral peritoneal reflection so that a safe anastomosis could be carried out between the cut end of the esophagus and the duodenum. The pathologist reported a diagnosis of poorly differentiated adenocarcinoma of the stomach with extension to the spleen, pancreas, left periadrenal connective tissue and transverse colon.

The postoperative course was satisfactory until the end of the second week, when the temperature became elevated and a fluid level with gas became evident under the left half of the diaphragm. Aspiration and drainage of an abscess cavity above and below the diaphragm was accomplished. It was difficult to maintain the patient in proper hydration, protein replacement and adequate sodium and potassium levels. Roentgenograms (Fig 9 *B* and *C*) taken on the seventh and eighth postoperative days revealed an intact anastomosis without obstruction.

Improvement was noticed during the third week, but on the twenty-third postoperative day, the patient suddenly became pulseless, respirations ceased and blood pressure could not be determined. After an interval of about five minutes the patient responded. During the ensuing week he was mentally confused. The cardiologists felt that his sudden collapse was based on acute potassium cardiac deficiency.

The patient is now well alerted and gaining weight. He shows no residual cerebral damage due to anoxia. At the time of writing, three months after the operation, his progress is satisfactory, *with no evidence of recurrence or distant metastasis.*

CASE 5.—A 52 year old white man was admitted to the hospital on Jan 24, 1950, with a history of

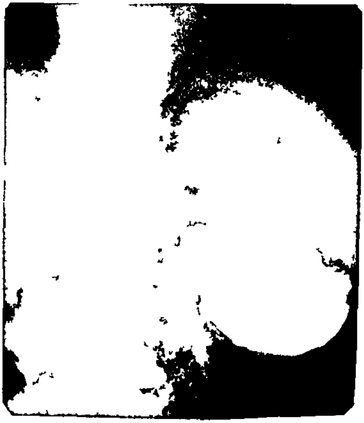

Fig 7 (Case [illegible]).—Pars media and fundus of the stomach markedly narrowed and fixed with a similar though smaller defect along the [illegible] curvature [illegible] the cardiac region.

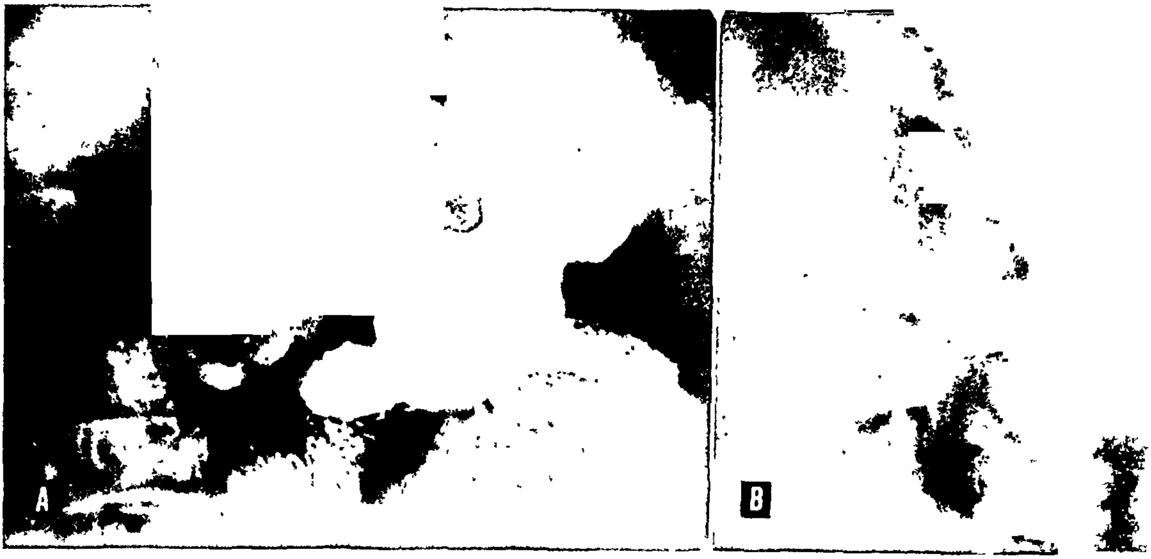

Fig. 8 (Case 3).—*A*, large ulcer niche near the cardia, along the lesser curvature, with a suggestion of a meniscus complex. *B*, adequate esophagoduodenal *anastomosis, with no evidence of obstruction. The barium* passes readily into the duodenum and the small bowel.

pain in the left upper abdominal area for the past eight months. The pain was dull, aching and constant. On one occasion prior to admission he vomited bright red blood. This was followed by tarry stools for several days. He lost 30 pounds (13.6 Kg.) in weight during this period.

Physical examination gave negative results except for tenderness in the left upper quadrant of the abdomen. Laboratory examination revealed secondary anemia, and gastric analysis showed no free hydrochloric acid. Roentgenograms (Fig. 10) revealed a polypoid mass about 6 cm. in diameter near the cardia on the posterior gastric wall. This was confirmed by gastroscopic study.

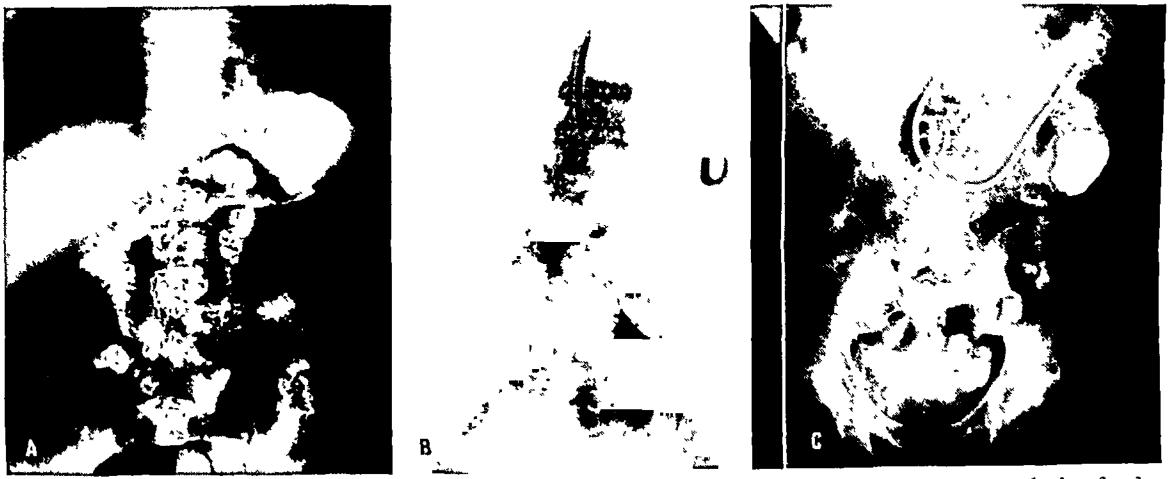

Fig. 9 (Case 4).—*A*, barium study of the stomach, revealing a large polypoid filling defect of the fundus and midportion of the stomach. The barium fills the large ulcer crat on the posterior wall in the region of the pars media. *B*, barium study with a Levine tube in the esophagus reveals *an intact anastomosis* on the seventh postoperative day. There is no evidence of obstruction; the barium passes readily into the duodenum and the jejunum. Note that the duodenum no longer has the normal C curve but is straight. *C*, roentgenogram taken on the ninth postoperative day (one day after administration of barium) revealing normal transit *time, with barium scattered through* the colon. The Levine tube outlines the course of the esophagus, the duodenum and the first part of the jejunum.

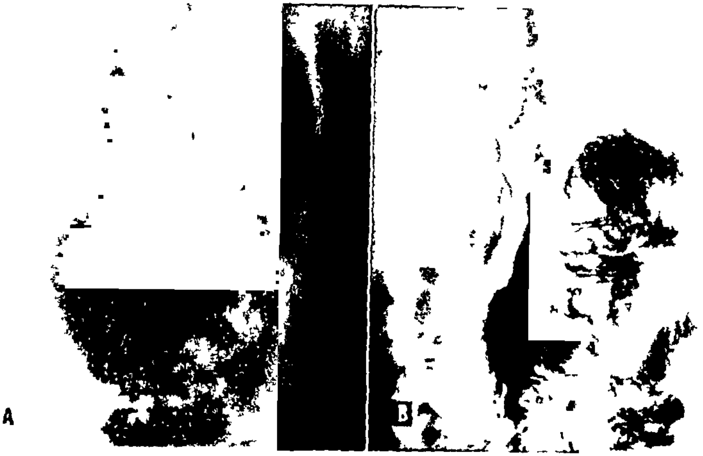

Fig 11 (Case 5) —A roentgenogram taken immediately after total gastrectomy revealing the gastrointestinal tube passing through the esophagus and the duodenum Note that the normal C curve of the duodenum is absent The entire duodenum is to the left of the midline and is almost straight B barium study on the thirteenth postoperative day revealing free passage of the barium through the anastomosis The duodenum is straight, with no evidence of a normal C curve The upper jejunal loops fill rapidly There is no evidence of obstruction to the flow of the barium

On February 7 a left subcostal transverse incision was made in the abdomen and exploration revealed a large, firm, irregular mass about 4 inches (10 cm) in diameter in the posterior wall of the stomach near the cardia The mass was attached to the body of the pancreas and there were many large, soft nodes along the lesser curvature of the stomach and about the celiac axis The lesion was considered operable The incision was then extended across the costal arch in the left seventh intercostal space dividing the intercostal muscles to the anterior axillary line This provided adequate exposure of the abdomen and the left pleural cavity The diaphragm was divided medially through the esophageal hiatus Total gastrectomy, splenectomy, partial pancreatectomy, resection of the greater omentum and excision of all the regional lymph nodes were performed The duodenum was easily mobilized after division of the lateral peritoneal reflection of the second portion so that a safe anastomosis could be accomplished between the divided end of the esophagus and the duodenum

Roentgenograms (Fig 11 A) taken on the afternoon of the day of operation revealed the Levine

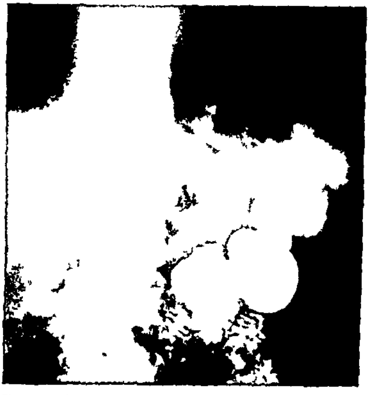

Fig 10 (Case 5) —Barium study revealing a polypoid defect in the cardiac and fundic portions of the posterior gastric wall

tube in the esophagus passing almost straight downward into the third part of the duodenum.

The pathologist's diagnosis was adenocarcinoma of the stomach with regional lymph node involvement.

The immediate postoperative course was complicated by atelectasis of the lower lobe of the left lung and pleural effusion. These conditions were treated actively, and the patient continued to show improvement. During the second week the temperature became elevated. An abscess was drained below the diaphragm, near the site of the anastomosis. At the time of writing his progress is satisfactory. Barium studies have shown the anastomosis to be intact and functioning without evidence of obstruction (Fig. 11*B*). The patient has gained weight, and the wounds are healed. He is given six feedings daily. At the most recent follow-up, two months after the operation, there was no evidence of recurrence.

COMMENT

It is not always possible to perform this type of anastomosis because of many factors—inadequate exposure, obesity, a large emphysematous chest, a wide costal arch, or a pathologic process that precludes a free and mobile duodenum. In many cases, as demonstrated in 3 of those here presented, the duodenum can be made more mobile by dissecting the second portion free from its lateral peritoneal reflection. This maneuver, with displacement of the duodenum and pancreas, will in no way compromise the blood supply or function of these structures. A decision as to whether this procedure is possible in any given patient undergoing total gastrectomy can be easily determined at operation.

It appears that this type of procedure has its place in certain selected cases of total gastrectomy and should provide a most satisfactory type of anastomosis. Its utilization should not increase the operative mortality in an operation of such magnitude, since the anastomosis can be accomplished more easily than can esophagojejunostomy. It appears to be a more physiologic procedure, in that it reestablishes the direct continuity of the gastrointestinal tract and eliminates the necessity of closure of a duodenal stump and an enteroanastomosis between the loops of the jejunum. It also eliminates uncertainty as to whether an anterior or a posterior colic type of anastomosis should be performed.

The duodenal tissues lend themselves well to suturing, and the healing process is as satisfactory as that of the jejunal type of anastomosis. One feels secure in placing sutures through this segment of the duodenum.

Restitution of the normal pathway for food and the digestive juices seems more physiologic than end-to-side anastomosis of the esophagus to the jejunum. It seems logical that the surgeon should attempt to restore or maintain as nearly as possible the normal anatomic relations of structures, tissues and organs of the body.

From the results in cases reported of this type of anastomosis, it appears that the procedure has definite merit and warrants consideration. In my opinion it should be brought to light again, in the hope that a sufficient number of surgeons will employ it to permit the accumulation of data establishing its value as compared to esophagojejunostomy.

SUMMARY

1. Five cases of esophagoduodenostomy after total gastrectomy are presented.

2. The opinion is expressed that this anastomosis, as compared to esophagojejunostomy, is preferable in certain selected cases.

3. The technic of the operation is described.

4. The author points out that the operation is simpler and easier to perform than esophagojejunostomy, eliminating some of the steps required in the latter procedure, namely, closure of the duodenal stump and enteroanastomosis, and that direct anastomosis of the esophagus to the duodenum appears to establish a more nearly normal anatomic and physiologic continuity of the gastrointestinal tract.

RÉSUMÉ

1. Cinq cas d'oesophagoduodenostomie aprés après gastrectomie totale sont présentés.

2. L'auteur est d'avis que cette anastomose est préférable à l'esophagojéjunostomie dans certains cas.

3. La technique de l'opération est décrite.

4. L'auteur nous démontre que l'opération est plus facile que l'oesophagojéjunostomie car elle élimine certains stades de cette procédure la fermeture du moignon duodenal et l'entero-anastomose. L'anastomose directe de l'esophage au duodénum parait établir une continuité

anatomique et physiologique gastointestinale beaucoup plus normale

RESUMEN

1 Se presentan cinco casos de esófagoduodenostomía después de una gastrectmía total

2 Se opina que esta anastomosis es preferible en ciertos casos seleccionados a la esofagoyeyunoestomía

3 Se describe la tecnica de la operación

4 El autor señala que la operación es más sencilla y facil de realizar que la esofagoyeyunostomía eliminando alguna de las etapas requeridas en este ultimo procedimiento principalmente el cierre del muñon duodenal y la enteroanastomosis La anastomosis directa del esófago al duodeno parece establecer una continuidad fisiológica y anatómica del tracto gastrointestinal mas cercana a lo normal

ZUSAMMENFASSUNG

1 Es wird ueber fuenf Faelle von Oesophagoduodenostomose nach totaler Magenresektion berichtet

2 Es wird die Meinung vertreten, dass dieser Anastomose im Vergleich mit der Oesophagojejunostomose in ausgewaehlten Faellen der Vorzug gebuehrt

3 Die Technik der Operation wird beschrieben

4 Der Verfasser betont dass die Operation einfacher und leichter auszufuehren ist als die Oesophagojejunostomose, da sie einige der Vorgaenge die die letztere erfordert, ausschaltet naemlich den Verschluss des Zwoelffingerdarmstumpfes und die Enteroanastomose Er hebt ferner hervor, dass augenscheinlich die direkte Verbindung zwischen Speiseroehre und Zwoelffingerdarm einen Verlauf des Magendarmkanals herstellt, der den normalen anatomischen und physiologischen Verhaeltnissen naeherkommt

RIASSUNTO

1 Presenta 5 casi di esofagoduodenostomia dopo gastrectomia totale

2 Ritiene che quest'anastomosi sia preferibile—in determinati casi—all'anastomosi fra esofago e digiuno

3 Descrive la tecnica dell'operazione

4 Da un confronto con l'esofagodigiunostomia, risulta che l'esofagoduodenostomia è piu' semplice e di piu' facile esecuzione, in quanto elimina talune fasi operatorie, come la chiusura del moncone duodenale e l'entero anastomosi L'unione dell'esofago al duodeno ricopierebbe d'altra parte meglio le condizioni anatomiche normali, ristabilendo una continuita' fisiologica del tratto gastro intestinale

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It is an unhealthy attitude to think success a trivial incident in life —Anonymous

A man should be called selfish not for pursuing his own good but for neglecting his neighbor's —Whately

Pancreatic Fluid Accumulation Subsequent to Trauma

Report of a Case

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CYSTS of the pancreas, although far from common, are not so rare as was formerly supposed. In recent years the literature on pancreatic cyst has grown immensely. The work of Koerte, Lazarus, McWhorter, Opie, Judd and many others has thrown light on the clinical and pathologic pictures of pseudocyst of the pancreas. We agree with Pinkham of San Francisco in disregarding the term "false" or "pseudo" cysts. Boyd, in his *Surgical Pathology*, states: "The chief cause of pseudocysts is a previous attack of acute necrosis and injury to the pancreas from trauma. As a result of a superficial lesion, there is an escape of pancreatic secretion and inflammatory exudate into the lesser sac, the foramen of Winslow becomes sealed and a cyst develops." It therefore appears logical to designate these as pancreatic accumulations resulting from trauma, acute and chronic pancreatitis and duct obstruction.

Recently, we had the opportunity to observe a case of *pancreatic accumulation* subsequent to trauma. It is not our intention to discuss at length the etiology, symptomatology or modes of treatment. The particular matters we regard worthy of attention in connection with this case are (1) failure in diagnosing the true nature of the condition before operation, and (2) the possibility of spontaneous rupture of the cyst into a neighboring viscus.

REPORT OF CASE

T. L. H., a Chinese engineer aged 34, entered the University Hospital on Dec. 10, 1947, with a history of pain in the abdomen and the lumbar region for one day. *One day prior to entry*, while repairing a certain machine at a height of 22 feet (6.7 M.), the patient misstepped and fell directly to the ground, landing on his buttocks with the machine striking hard on the left upper quadrant of the abdomen. *He lost consciousness for one minute. After recovery* he felt some dull pain in the whole abdomen, particularly in the epigastrium.

Seven hours after the accident he vomited, and the vomiting recurred three hours later. The vomitus at first contained dark blood mixed with food particles. In the second attack the vomitus was only faintly blood stained. Later the pain became severe, causing him to double up. He was confined to bed because of this pain.

The past history was noncontributory except for gonococcic urethritis five years previously. Physical examination showed the patient to be acutely ill, tossing about in bed and moaning with pain. The abdomen was not distended, but diffusely rigid and tender. Rebound tenderness was marked throughout. Tenderness was also present in both flanks and both costovertebral angles. Hepatic dullness was obscured along the midclavicular line. Rectal examination and roentgen examination revealed no abnormality. The temperature was 100.2 F.; the pulse rate, 100 per minute, and the blood pressure in millimeters of mercury, 116 systolic and 80 diastolic. The erythrocyte count was 2,660,000 per cubic millimeter of blood, with 70 per cent hemoglobin, and the leukocyte count was 11,800. A diagnosis of contusion of the stomach was made, and the patient was treated conservatively.

From admission, the patient ran a fluctuating temperature of low grade. His condition improved remarkably except that the pain in the left upper quadrant persisted. Occasionally he moaned with acute colicky pain in the epigastrium. There was no further hematemesis, but tarry stools were noticed. Seven days after admission a bulging mass developed in the left upper abdominal quadrant, which was tender and dull on percussion. Within a week there was rapid reduction in the erythrocyte count to 2,000,000 and in the hemoglobin to 55. The following possibilities immediately became apparent; a retroperitoneal hematoma, subcapsular rupture of the spleen or a hematoma resulting from partial rupture of the stomach. Exploratory laparotomy was done on December 19, nine days after the injury.

The operation was done with continuous spinal anesthesia after the usual preparation and blood transfusion. A left transverse Hamilton Bailey incision was made, through which the stomach imme-

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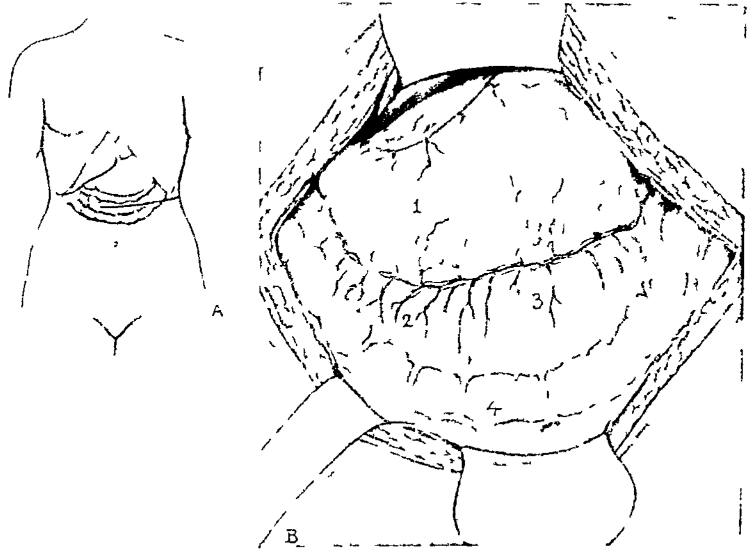


Fig 1 — *A* line of incision *B* cystic mass shown in its relation to the stomach and the large bowel *1* Stomach in transparency showing outline of cyst *2* gastrocolic ligament *3* cystic mass under gastrocolic ligament, *4* transverse colon

diately protruded being pushed forward by a huge mass that appeared to be posterior to the pancreas. Pancreatic tissue was plainly visible along the greater curvature of the stomach. The transverse colon and omentum were turned upward and an adherent loop of jejunum 4 inches (10 cm) from the ligament of Treitz was seen to be adherent to the mesocolon. Closer examination revealed that this was firmly adherent and had an appearance of having been sutured as one would do a posterior gastroenterostomy. Further examination revealed an area of plastic fibrin posterior and to the left of the stomach and superior to the transverse colon and splenic flexure in the region of the pancreas. When this fibrinous material was wiped away perforation of the underlying tissues resulted and the field was immediately flooded with a pale straw colored fluid containing bits of fibrin. Exploration through the opening with the index finger revealed a huge cavity with a capacity of at least 2 000 cc. It was impossible to determine whether this was in the pancreas itself or whether it was a retropancreatic cyst but the fluid was unmistakably pancreatic. To make sure that there was no connection with the gastric cavity itself a small incision was made in the anterior wall of the stomach and an exploring finger was introduced and made to palpate with the exploring finger of the other hand in the aforementioned cavity. The small opening in the stomach was closed and a 22 gage rubber tube was introduced into the pancreatic cavity and brought through a stab wound in the left side of the abdominal wall. Cigarette drains were placed outside the cavity and also brought out distal to the main wound. The abdomen was closed with interrupted nonabsorbable sutures.

The patient bore the operation well although it consumed forty minutes. The preoperative diagnosis was retroperitoneal hematoma, traumatic with continuous bleeding. The postoperative diagnosis was pancreatic fluid accumulation subsequent to trauma.

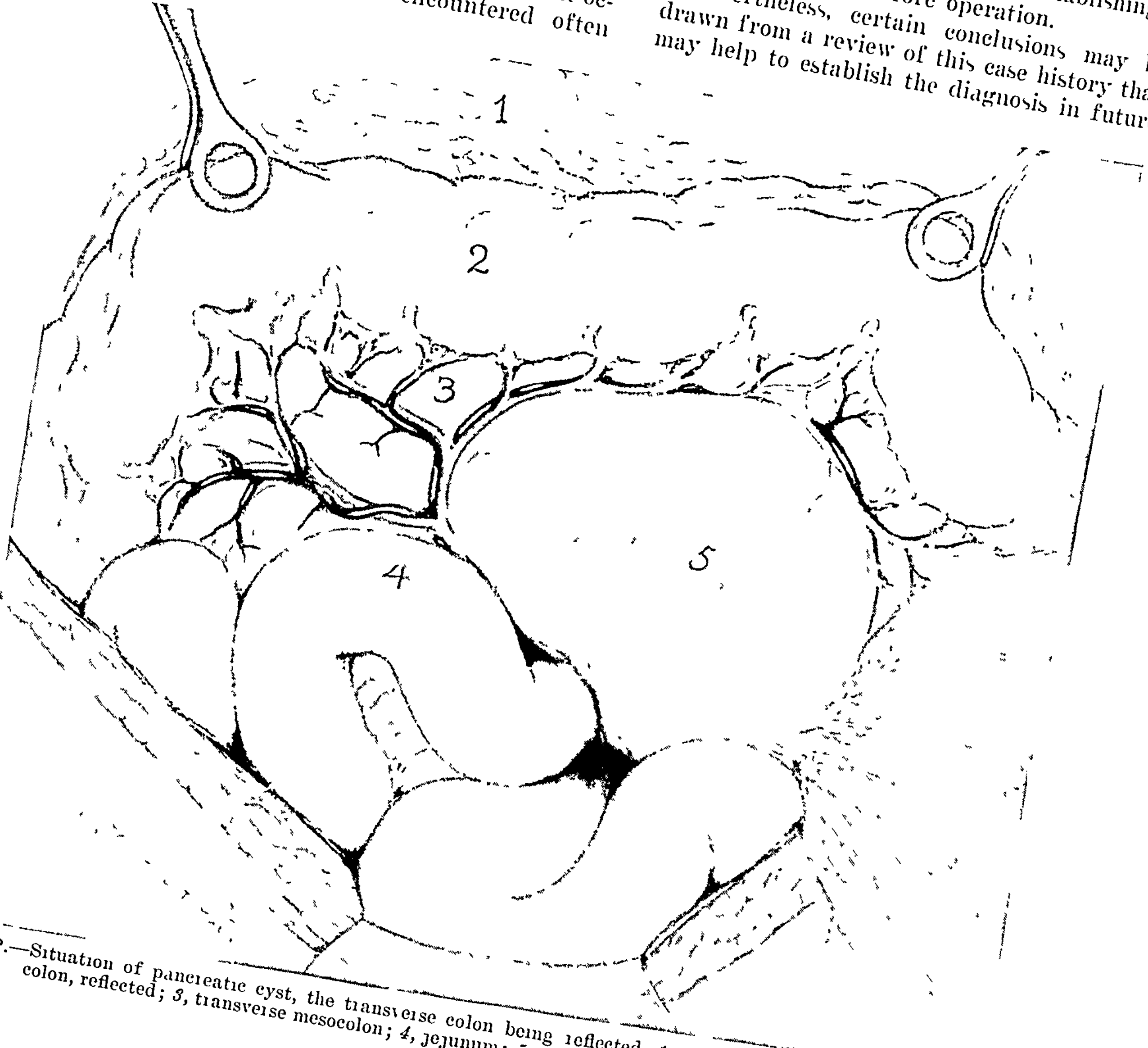
Immediately after the operation a high fever developed. This lasted for two days, after which the temperatures did not rise beyond 99 6 F. The pancreatic fluid drained from the cavity was about

400 cc. daily for one and one-half weeks and was reduced to 30 cc. daily in the third week. Four weeks after the operation some rice grains and other undigested food drained into the bottle. The tube was removed the next day, after which the wound dribbled some purulent discharge for two weeks, closing completely on February 8. The sinus wound and the surrounding skin showed no sign of digestion. The cystic fluid contained 512 units of amylase; after two weeks of drainage it contained 256 units. The patient was discharged from the hospital on Feb. 17, 1948, in excellent condition.

COMMENT

Pancreatic cyst is a disease of infrequent occurrence, although it is encountered often enough to merit some consideration with regard to accurate diagnosis and effective treatment. A review of accumulated clinical records reveals that this diagnosis has been made in only 9 cases at the Lahey Clinic from its organization in 1926 to October 1, 1945. Although in the recent fifteen years knowledge of lesions of the pancreas and the technic of their surgical management have advanced extraordinarily, surgeons often encounter cases in which there is considerable difficulty in establishing a correct diagnosis before operation.

Nevertheless, certain conclusions may be drawn from a review of this case history that may help to establish the diagnosis in future



.—Situation of pancreatic cyst, the transverse colon being reflected. *1*, Greater omentum; *2*, transverse colon, reflected; *3*, transverse mesocolon; *4*, jejunum; *5*, cyst seen through thinned-out mesocolon.

cases. A pancreatic cyst manifests itself usually in two ways: by tumor and by pain; however, this is not at all pathognomonic. The case here reported demonstrates that both the history and the physical condition of a patient suffering from pancreatic accumulation subsequent to trauma are often perplexing. Fairchild has shown that serious intra-abdominal trauma may be caused by external violence with little or no external evidence of injury. One concludes therefore that even though the pancreas is so situated as to be well protected, its rupture is probably less rare than is generally supposed. If this had been kept in mind, the diagnosis in our case would probably have been accurate. This challenges us to be more mindful of the possibility of uncommon conditions in every unusual case.

As to the differential diagnosis, several points are of interest. Our patient had a history of epigastric pain associated with hematemesis and melena that followed a direct trauma over the upper part of the abdomen. The possibility of contusion of the abdomen with partial rupture of the stomach was strongly suspected. On exploration the stomach was apparently normal and no evidence of subserous rupture could be identified. No injury of the bowel could be demonstrated. We are still in doubt whether the entire picture could be explained solely on the basis of a single pancreatic lesion. In the second place, history did not make it possible for us to differentiate this case from a case of late or delayed rupture of the spleen subsequent to trauma. We were misled by the appearance of a tender swelling in the left upper abdominal quadrant seven days after trauma, accompanied by a rapid reduction in hemoglobin content, although Koucky and his associates have reported severe anemia in 1 of their 6 cases.

Various investigators report that roentgen examination is a major aid in the diagnosis, and gastric pneumograms have been taken in several questionable cases with notable success. In our opinion this is not conclusive, although roentgenograms may prove valuable in the hands of an expert.

The perforation of a pancreatic cyst, according to Koucky, is rare but it must be considered in differential diagnosis of the acute traumatic and nontraumatic abdominal lesions. Koucky and his co-workers reported 6 cases of perforation into the free abdominal cavity and 1 of perforation into the duodenum. According to their report, the rupture appears to have been spontaneous and presumably secondary to the increased intracystic pressure or to necrosis of the cyst wall due to trauma. Parsons, as early as 1857, and Ball in 1887 both described cases of pancreatic cyst in which there was sudden disappearance of the abdominal tumor followed by severe diarrhea. Perforated pancreatic cysts are probably not as rare an occurrence as is generally supposed, because nature continuously demonstrates her corrective technic. Our case illustrates this well. When the abdomen was opened, a loop of jejunum was adherent to the cyst wall, which was about to burst. If the operation had been delayed, the cyst might have ruptured spontaneously into the adherent jejunum as it did four weeks later.

In our opinion, however, rupture into the peritoneal cavity would have preceded rupture into the jejunum because gentle removal of the plastic exudate resulted in release of the accumulated pancreatic fluid, which was under tremendous pressure.

THERAPY

Only a few words will be said concerning treatment. A number of operations, including simple drainage, marsupialization with packing, complete excision and various anastomoses of the cysts with the intestinal canal and gallbladder have been developed, and each has its advocates. We believe "the simpler the better." Simple drainage with a rubber tube was the operative procedure in our case, and the sinus wound healed completely within fifty days. Of course, a single case cannot be regarded as conclusive. We agree with others that a persistent pancreatic fistula is not greatly to be feared with this type of cyst, for, as Judd, Mattson and Mahorner have shown, the absence of a lining of columnar epithelial cells permits the growth of granulation tissue and rapid obliteration of the cyst.

SUMMARY

The authors suggest disregarding the terms "pseudocyst" and "false cyst." They report a case of pancreatic fluid accumulation subsequent to trauma and discuss their observations, pointing out the difficulty of establishing a correct diagnosis before operation. A few points of diagnostic interest are discussed also. They advocate as simple an operation as possible and state that persistent pancreatic fistula is not to be feared if drainage is adequate. The drainage tube should always be brought out through a stab wound lateral and posterior to the incision.

RÉSUMÉ

Les auteurs suggèrent qu'on abandonne les termes "pseudokystes" et "faux kystes." Ils rapportent un cas d'accumulation de fluide pancréatique consécutif à un tramatisme. Ils discutent leurs observations, soulignant surtout la difficulté d'établir préopératoirement un diagnostic correct. Quelques points tirés du diagnostic sont discutés. Aussi, ils recommandent une opération aussi simple que possible et ils affirment qu'une fistule pancréatique persistante n'est pas à craindre si le drainage est adéquat.

ZUSAMMENFASSUNG

Die Verfasser schlagen vor, die Bezeichnung "Pseudozyste" und "falsche Zyste" aufzugeben. Sie berichten einen Fall von im Anschluss an eine Verletzung aufgetretener Pankreassaftansammlung. Sie besprechen ihre Beobachtungen und heben die Schwierigkeit, eine richtige Diagnose vor der Operation zu stellen, hervor. Einige Punkte von diagnostischer Bedeutung werden eroertert. Die Verfasser schlagen ferner vor, eine moeglichst einfache Operation anzuwenden und behaupten, dass eine staendige Pankreasfistel nicht zu befuerchten sei, wenn ausreichend draeniert wird.

RESUMEN

Los autores aconsejan desatender los términos "pseudoquiste" y "quiste falso." Comunican un caso de acumulación de líquido pancreático subsecuente al trauma, y exponen sus observaciones, señalando la dificultad que hay para establecer un diagnóstico correcto antes de la operación. Se estudian unos cuantos puntos de interés diagnóstico. También abogan por una operación tan sencilla como sea posible y afirman que no debe de temerse a la fístula pancreática si el drenaje es adecuado.

RIASSUNTO

Gli AA. descrivono un caso di accumulo di liquido pancreatico successivo ad un trauma. Ritengono inesatto il termine di "pseudocisti" o di "cisti spuria." Accennano alle difficolta' di una diagnosi preoperatoria. Avanzano alcuni punti fondamentali per la formulazione di una diagnosi corretta. Consigliano un'operazione quanto piu' semplice possibile. Ritengono eccessivo il timore di una fistola pancreatica persistente qualora il drenaggio sia sufficiente.

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Bilharziasis of the Urinary Tract

Some Clinical Aspects

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BILHARZIASIS is the main scourge of the Egyptian peasant and the principal concern of the Egyptian doctor, especially the urologist. Eleven million of eighteen million inhabitants are affected by this dreadful disease. One is therefore justified in speaking of an Egyptian urology.

Although bilharziasis is rare in the United States, it has some general interest for two reasons. First, as a result of the war bilharziasis will be encountered not only in the many tropical countries where it is endemic but in places where it has been introduced by persons who have resided for some time in tropical and subtropical countries. A large number of American soldiers, sailors and airmen have returned from the tropics and the American physician or surgeon is now confronted with the problem of diagnosing and treating diseases rarely, if ever, encountered in the States before. It should not be forgotten that urinary schistosomiasis occurs not only in Egypt but in Arabia, East Africa, South Africa, Madagascar, Palestine, Australia and Europe (in some isolated centers in Portugal). As a matter of fact, the Anglo-American literature of the last few years contains sporadic reports of urinary bilharziasis. The apparently difficult endoscopic studies described therein would have been much easier had the authors been aware of the possible occurrence of the disease.

The second and more important reason for discussing some aspects of urinary bilharziasis is that this disease produces an extraordinary variety of pathologic conditions resembling those associated with other diseases of the urinary tract. The study of bilharziasis is therefore of great help to the study of urology in general, hence diagnostic rules and principles of therapy enunciated for bilharziasis are applicable to other diseases of the urinary tract.

No other condition proves in such an [illegible]utable manner the importance of con[illegible] the urinary system as a series of interconnected organs constantly influencing each other, especially when diseased. Many urologists, among them von Lichtenberg and Schwartz, have emphasized the fact that in any urologic diagnosis one should ascertain the repercussions of a pathologic condition in a given organ on the rest of the genitourinary tract. The final diagnosis should, therefore, be based on complete physiopathologic data accumulated by a thorough examination.

For many years surgeons have been stressing the principle of observing the pathogenesis of disease rather than the pathologic [illegible] of the organ. Bilharziasis shows in a [illegible] manner that impairment of renal [illegible] may depend to a large extent on [illegible] disturbances of the lower part of [illegible] tract. This will bear repetition [illegible] parts of the urinary system [illegible] considered as inseparable, from the [illegible] as well as from the anatomic point of [illegible]

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Submitted for publication Jan 24 19[illegible]

The diseased ureter is the most important and common example. In the presence of urinary bilharziasis the ureter is affected in different ways and places, and the repercussions on the function of the urinary tract as a whole are accordingly multiple The lowest part of the ureter is particularly affected. This can be readily explained by remembering that the infection develops in the venous network and not in the lymphatic vessels The ureter loses its elasticity, gradually becomes rigid and deformed and finally is replaced by a fibrous

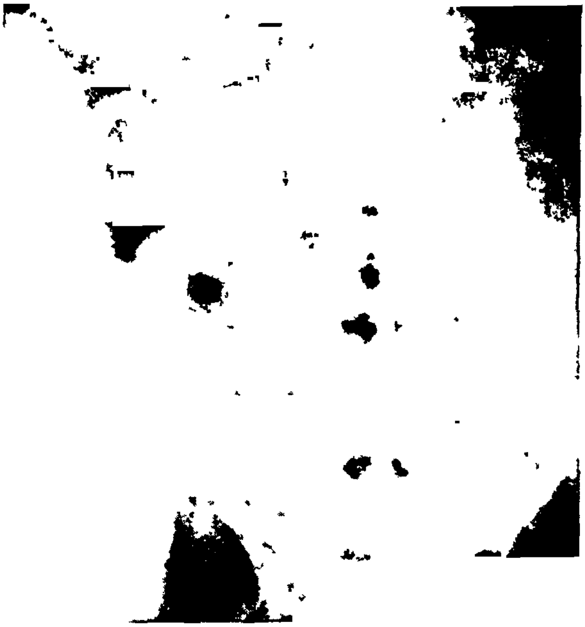

Fig. 2.—Double stricture of upper third of ureter, with secondary hydronephrotic dilatation of renal pelvis and, to a lesser degree, of calyces; atonic dilatation of ureter due to bilharzial infiltration.

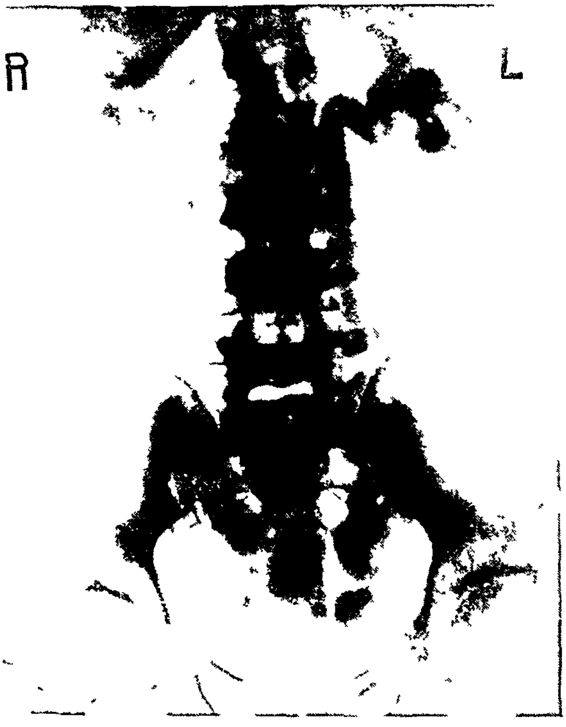

Fig. 3.—Enormous bilateral dilatation of ureters following strictures in their lower ends. (Intravenous pyelogram.)

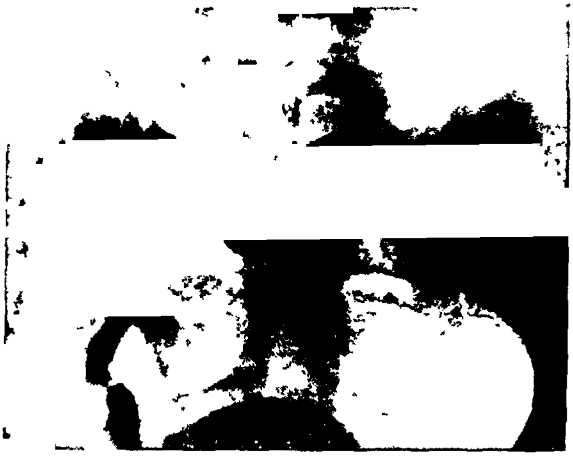

Fig. 4.—Bilharzial stricture of lower third of ureter Cured by resection of stricture

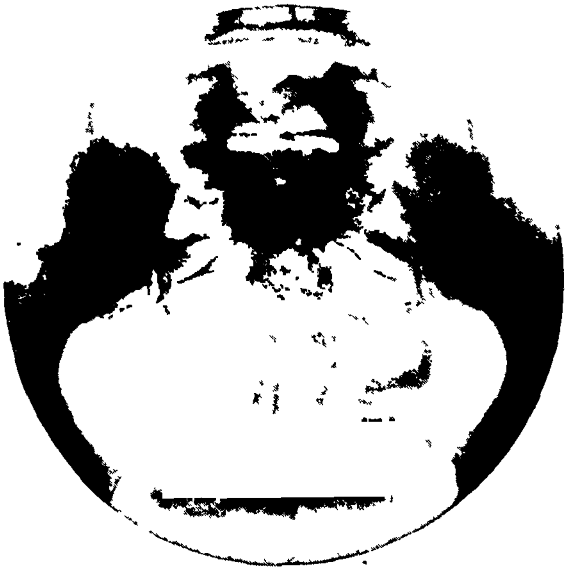

Fig. 5.—Stricture and kink of juxtavesical portion of ureter. Stricture is due to bilharzial infiltration of wall; kink is due to a periureteric adhesion.

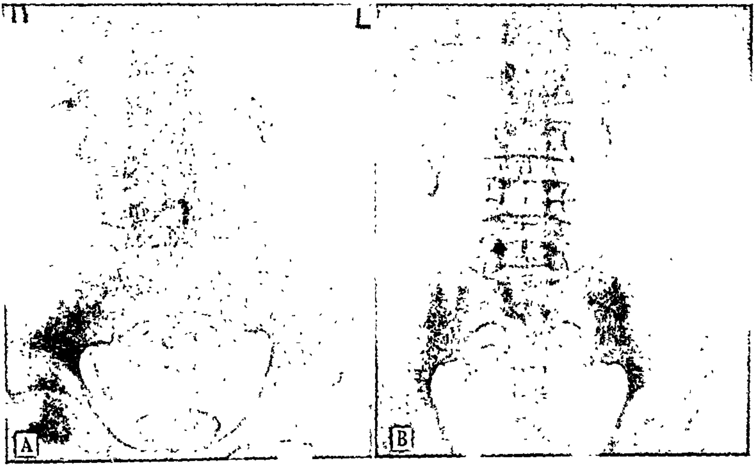

Fig. 6.—*A*, typical early periureteritis of second degree. *B*, stone in middle third of ureter, accompanied with slight dilatation of proximal portion. Pelvis is unaffected.

tube, the lumen of which may ultimately be obliterated by contraction.

To approach the subject first from a practical angle, that of roentgen diagnosis, the main conditions that can be recognized by roentgenographic study are as follows:

1. *Calcification.*—This is a mode of defense of the organism against the bilharzial ova, which are stuffed in the subepithelial layer, mostly in the lymphatics. It is just this calcification which produces roentgenopacity, typical in cases of bilharziasis of the urinary tract. During the contraction of the bladder and/or the ureters the ova are extruded into the lumen, and this lesion of the epithelial lining creates favorable "lithogenic" conditions. The whole ureter is seen as an opaque tube (Fig. 1). Knowledge of this condition is very important prior to transplantation of the ureters into the large bowel.

2. *Dilatation.*—This condition, often accompanied by atonia, is the result of parasitic infiltration of the ureters (Fig. 2). Infection and obstruction, their two most terrible enemies, soon play havoc with the already damaged upper portion of the urinary tract, and at the operating table one sees huge ureters looking like loops of intestine in diameter and length (Fig. 3). It is obvious that in such cases one is confronted with several technical difficulties.

3. *Strictures.*—Strictures (Fig. 4) develop from cicatrizing lesions of the epithelial lining and are places of election for stones to be formed or arrested.

4. *Kinks.*—Kinking (Fig. 5) due to periureteric adhesions occurs as a result of an infection that ascends along the lymphatics around the urether. These kinks produce serious impairment of renal function. In the United States one generally meets this condition in cases of adnexitis in either female or male patients, in the latter instances indicating chronic inflammation of the prostate and the seminal vesicles. In a patient with bilharziasis, periureteritis manifests itself in many different ways. At times it is a reversible condition in which the ureters are of normal size and shape, the only pathologic sign being a permanently filled ureter as shown by a contrast

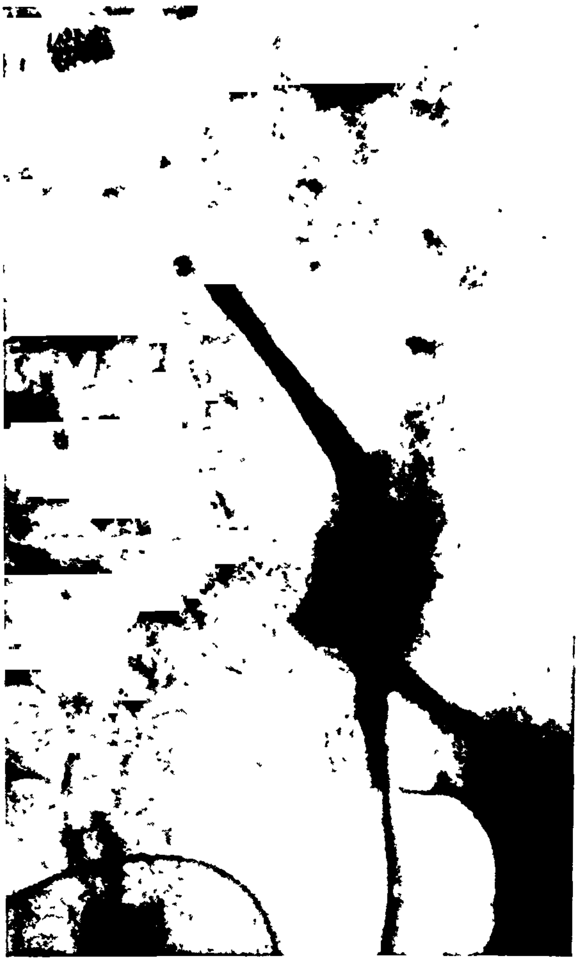

Fig. 7.—Combination of contrast medium and air insufflation, indicates multiple filling defects of varying size in course of ureter, due to bilharzial papillomas.

roentgenogram (Fig. 6*A*). At other times the ureter is tortuous, dilated and atonic. There are, of course, all sorts of intermediate states (Fig. 6*B*). The importance of the periureteral disturbance associated with different diseases is generally underestimated in respect to the damage done to the ureters and its repercussions on the function of the kidneys.

In the beginning the condition may be cured by diathermy. Later, nephroureterolysis will have to be resorted to. If left untreated, the kidney is doomed and will soon become hydronephrotic. In my opinion this is the best example of conservative urologic treatment aimed at restoring normal function.

5. *Papillomas.*—These growths are sometimes implanted in considerable numbers along the ureters. My associates and I have used a combination of contrast medium and air or oxygen insufflation in the ureters in order to visualize these tumors (Fig. 7). This method is useful in any case of suspected tumor of the ureter.

6. *Calculi of the Urinary Tract.*—The high incidence as well as the variety of stone formation in the urinary tract in Egypt may be explained by: (*1*) the different bilharzial manifestations and (*2*) the frequency of intestinal infection (Fig. 8). Ureteral calculi especially are often seen in Egypt. They may have descended from the renal cavities and become arrested by a stricture, or they may have been formed by gradual deposition of mineral constituents of the urine. A large majority of stones of bilharzial origin belong to the latter group and are called primary stones. Bilharzia produces all the conditions favoring this local lithogenesis—if we may thus call it. The following roentgenologic items are in favor of this theory:

1. Extensive ureteral calculosis without any roentgen sign of nephrolithiasis or clinical symptoms of stone migration (Fig. 9).
2. Bilateral huge calculi of particular size and shape (Fig. 10).
3. Characteristic fusiform calculi (Fig. 11) or others representing a complete cast of the dilated ureteral cavity with its kinks (Fig. 12).

Stagnant urine and the presence of a foreign body, such as sandy patches, a papilloma, or a detached piece of epithelium, are ideal for primary calculus formation. Fig. 13 shows calculus formation of the ureter above a neoplasm. (Another factor besides bilharziasis which has been responsible for the formation of a primary stone in the ureter is a simple catgut suture, as I reported in 1929).

It is well known that ureteral stones present a series of technical operative difficulties. Even large stones are often movable in extremely wide and tortuous ureters, and if the surgeon does not take the precaution of fixing the calculus from the very beginning and plays with it instead, he will soon find out that the stone has played with *him* and has escaped up into the pelvis.

The best technic for stones in the juxtavesical portion of the ureter, especially when the condition is bilateral and accompanied by se-

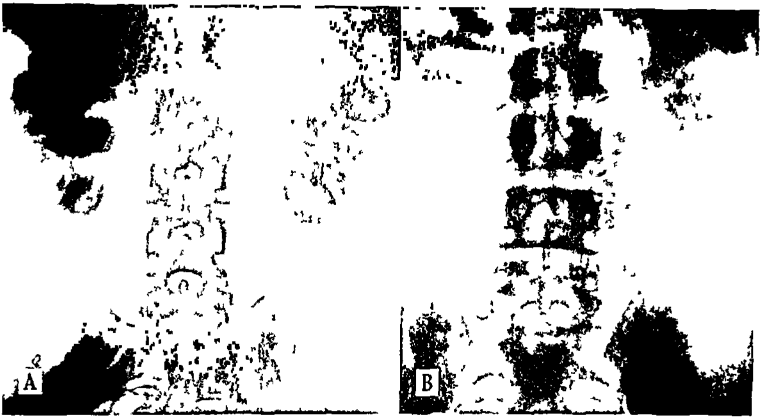

Fig 8.—*A*, bilateral calculi in young Egyptian in good general condition. Examination of urinary tract revealed minimal abnormalities as compared with those observed roentgenologically. *B*, plain roentgenogram showing large numbers of calculi in lower pole of left kidney and enormous dilatation of ureter. No roentgen signs of urolithiasis on right side.

vere periureteritis is in my opinion the midline incision followed by extraperitonization of the bladder. It is remarkable how incisions up to 4 or 5 cm long in this part of the ureter heal quickly. This is probably due to high vascularity. The bilharzial bladder with its typical roentgenogram, thanks to the calcium deposits in its walls, is of high interest from a

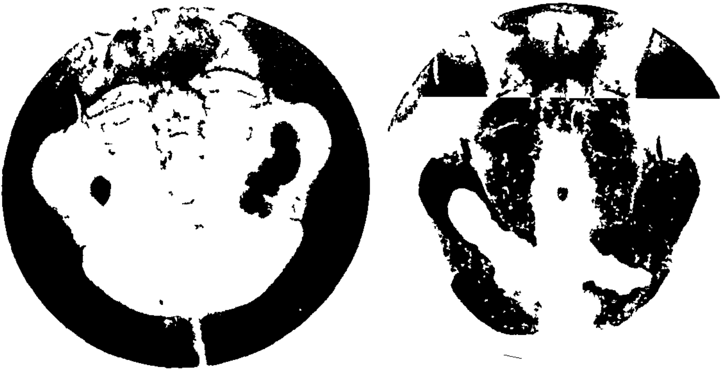

Fig 9.—*Left*, primary ureteral calculi numerous on left side. No history of renal colic or renal stones. *Right*, huge bilateral calculi in lowest part of ureters. These were simultaneously removed through a midline incision.

Fig. 10.—Fusiform calculus of ureter, quite common in Egypt; probably primary.

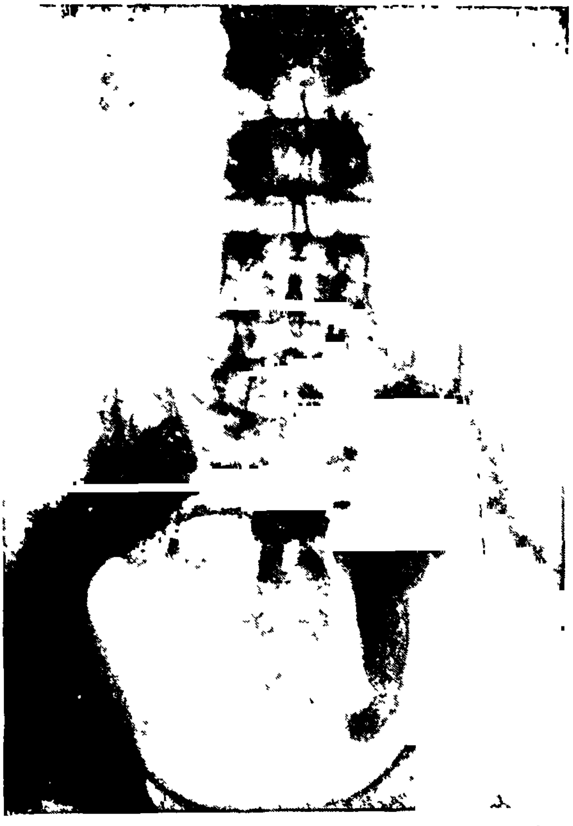

Fig. 11.—Enormous stone of left ureter, presenting almost a cast of three-fourths of the whole ureter. Calculi in right kidney.

clinical as well as an experimental point of view.

It is beyond dispute that bilharziasis can produce any sort of vesical tumor, from a minute papilloma to a highly malignant nodular carcinoma which kills the patient in a very short time. Figures 13 to 15 represent bilharzial tumor of the bladder.

Often there appear in our outpatient clinics persons about 20 years of age who come with an already well developed, incurable cancer (Fig. 16). In private practice too, the urologist is often consulted for similar conditions, with the curtain of the bilharzial tragedy about to fall on the last scene. These patients probably have been repeatedly infected in childhood. The epithelial lining of the bladder is constantly irritated and some of the epithelial cells break through the basement membrane and start to multiply wildly.

Therapy.—As to the treatment of these vesical tumors, I should like to emphasize two things: (*1*) the magnificent results obtained by endoscopic resection, which often surpass those by open partial resection, and (*2*) the enormous *difficulty of radical operation; that is,* cystectomy accompanied by transplantation of the ureters. The reason lies in the fact that the ureters are extremely damaged, especially in their lower parts; the trigone, the internal urethral orifice and the perivesical tissues are also extensively infiltrated. This fact explains why sclerosis of the vesical neck is such a frequent occurrence in Egypt. It is, on the other hand, a rather rare one in Europe or the States.

Bilharziasis also affects the incidence of prostatic enlargement, because it produces such an extensive fibrous tissue deposition that the prostate undergoes marked atrophy. The now much smaller gland contains islets of calcified tissue scattered throughout. Prostatic abscesses are also observed. These pseudodiverticula are important, because they act as multiple foci of infection.

By cystoscopic examination one sees only a transverse ridge stretching across the vesical neck, narrowing of the trigone and trabeculation of the bladder wall.

Needless to say, these conditions are ideally suited for transurethral resection, and I think no urologist will attempt a suprapubic opera-

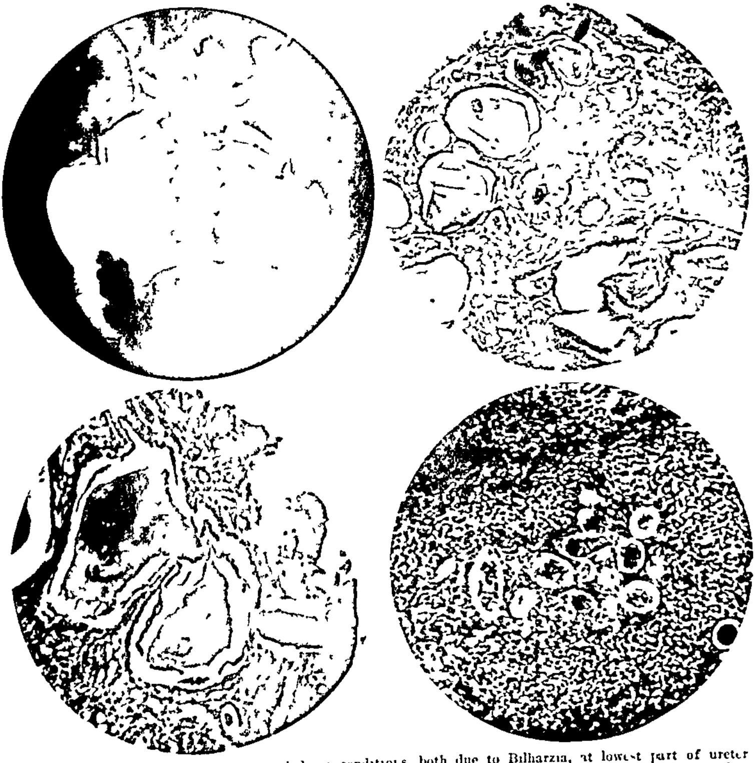

Fig 12—*Upper left* two different pathologic conditions both due to Bilharzia, at lowest part of ureter primary stone formation in lumen and bilharzial tumor (cystadenoma) at vesical side revealed roentgenologically as filling defect *Upper right* photomicrograph of bilharzial cystadenoma *Lower left* same specimen high power field Note numerous calcified Bilharzia ova *Lower right* bilharzial carcinoma of bladder in 20 year old Egyptian Note large numbers of calcified Bilharzia ova at center Patient had almost a metastatic lesion in epididymus

tion which will be 'painful alike to the fingers and the conscience (Roche)

The prostatic portion of the urethra is a seat of typical bilharzial manifestations Strictures are produced by infiltration and followed by atrophy of the posterior portion of the urethra The presence of prostatic abscesses and urethral stricture explain the frequent occurrence of calculi in the prostatic urethra (Figs 17 and 18)

Stagnation of urine in the posterior portion of the urethra and pathologic changes in the vesical neck apparently play a strong role in stone formation in the bladder as well as in the kidneys

Stricture of the urethra in Egypt differs in

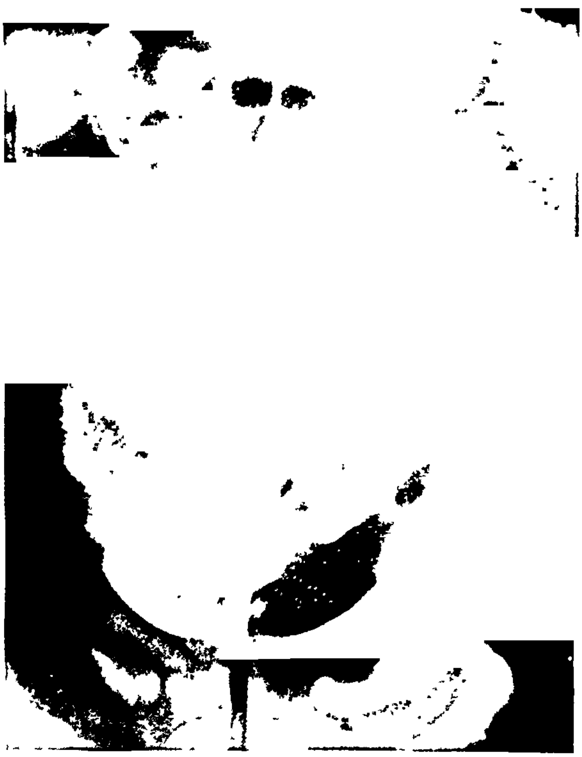

Fig. 13.—Chronic prostatitis with stone formation followed by sclerosis of vesical neck. Note vesicoureteral reflux.

three ways from stricture in countries where bilharziasis does not exist. First, stricture of the urethra is more common in Egypt. Second, the perineal fistula, which completes the stricture, is often seen in the Nile valley. It presents a most ugly and frightful appearance and is often accompanied by periurethritis and periurethral abscesses; sometimes the urethral fistula has several tracts and opens not only in the perineum but in the scrotum and even in the anterior abdominal wall above the pubis. Third, the disease affects young adults and even children.

One can see at a glance how varied are the surgical problems that present themselves to the urologist in such cases. The results obtained by my associates and myself in the management of the urethral stricture have been very encouraging since we adopted a method I described in this Journal (September 1946). Briefly, it consists of simultaneous manipulation by the two hands, the left index finger being introduced into the posterior portion of the urethra, while a lithotrite is passed up to the stricture; the two are then approximated by an accordion-like compression of the stricture.

SUMMARY

Some highlights of the Clinic of Urinary Bilharziasis ("Egyptian Urology") are given in a kaleidoscopic manner. The importance of roentgen study is stressed, and different surgical aspects are discussed.

RÉSUMÉ

Nous avons ici un rapport très intéressant de la clinique urinaire Bilharziasis (Urologie égyptienne). L'importance de l'étude à l'aide de rayons "X" est évaluée et les différents procédés chirurgieaux sont analysés et discutés.

RESUMEN

En este trabajo se presentan de un modo caleidoscópico, algunos puntos de interés en la clínica de la bilharziasis urinaria ("Urologia egipcia") destacando la importancia del estudio roentgenográfico y considerándose sus

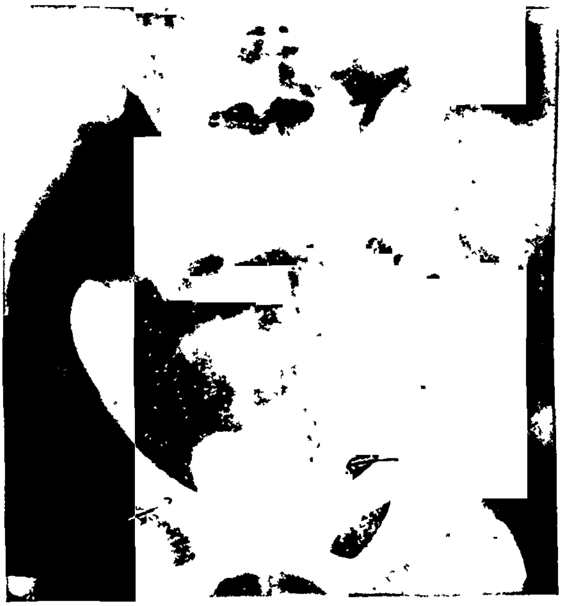

Fig. 14.—Enormous cluster of huge stones in posterior portion of urethra. Cured by suprapubic cystostomy.

diferentes aspectos quirurgicos.

RIASSUNTO

Rivista sintetica della Bilharziosi urinaria. Speciale importanza viene attribuita all'indagine radiografica; la cura chirurgica viene discussa in base a determinate indicazioni.

ZUSAMMENFASSUNG

Es werden in bunter Folge einige Schlaglichter der Klinik der Bilharzschen Krankheit ('Aegyptische Harnblutung') gegeben. Die Bedeutung der Roentgenuntersuchung wird hervorgehoben, und verschiedene chirurgische Gesichtspunkte werden eroertert.

Echoes of the Past

II. Swiss Contributions to Medicine and Surgery

"La Science n'a pas de patrie" said Louis Pasteur. This motto, adopted by the International College of Surgeons, is a constant reminder of the universality of science. A true scientist is a citizen of the world; his quest is for knowledge that will benefit all mankind. His knowledge is acquired for the good of all men, irrespective of their ancestry. Of all the sciences, medicine most nearly approaches the universal, for the names of those who brought about its advancement are names from many nations. Strangely enough that small but admirable nation Switzerland, whose citizens have contributed much to medicine and surgery, is not sufficiently honored in the roll call of great medical names.

Anatomy is the first division of medicine that owes acclaim to the men of Switzerland. There was J. C. Peyer, who described the patches in the small intestine which bear his name. Other contributors to anatomy are J. C. Brunner, who discovered the submucosal glands in the duodenum, and J. H. Glaser, who described the petrotympanic fissure of the temporal bone. Another Swiss, C. Bauhin, was one of the earliest anatomists to study the ileocecal valve. His fellow countryman J. J. Harder discovered the accessory lacrimal glands. In more recent years the name of W. His has been immortalized by the atrioventricular bundle of the heart, which bears his name. F. Goll is honored for his elucidation of the posterior spinal column.

In the physiologic field, A. Koelliker is recalled as the creator of cytophysiology. The seventeenth century witnessed the publication of a masterful work on pathology entitled "Sepulchretum" (1679). This was written by Theophilus Bonet, the forerunner of Morgagni. Modern pathology honors E. Ziegler, whose classic treatise on pathologic anatomy has been translated into every modern language.

Categorically one would name Albrecht von Haller at the head of the list of physiologists. Following close behind would be the names of Theodore Kocher, L. G. Courvoisier, O. Naegeli, H. Sahli, C. Roux and J. L. Reverdin. Mention should be made of A. Yersin, who discovered the organism *Bacillus pestis* and perfected the serum against it. Little thought is given to the fact that Horner's oculosympathetic syndrome is named for a Swiss, J. F. Horner.

In the realm of surgery, a native of Switzerland, Thomas Rima (1775-1843), explained the disturbed blood circulation in varicose veins. His operations upon patients with this condition antedated those of Trendelenburg. Another Swiss surgeon of fame was J. Gonin, who invented an operative procedure for the treatment of retinal detachment.

This enumeration of Swiss masters of medicine and surgery is a well deserved acknowledgement. Swiss men of science have demonstrated the true humanistic spirit of medicine. Switzerland, the cradle of democracy, has contributed worthily to the most democratic of all sciences.—*Bernard J. Ficarra, M.D., F.I.C.S.*

Obstruction of the Lower Portion of the Urinary Tract in Infants and Children

MEREDITH F. CAMPBELL, M.D.
NEW YORK

NEARLY all obstructions of the urinary tract in the young are congenital; acquired obstructions are predominantly the result of trauma or infection with subsesequent scarring of the urethra or its contiguous surrounding tissues. Of these various obstructive lesions, congenital stenosis of the external meatus and congenital contracture of the vesical outlet, in the order named, are by far the most common. In my experience congenital stricture elsewhere in the urethra has ranked third. Other conditions to be considered here are stenosis of the prepuce, valvular obstruction of the prostatic portion of the urethra, hypertrophy of the verumontanum, urethral and prostatic tumors and neuromuscular disease of the vesical outlet causing obstruction. With all these forms of obstruction secondary calculous blockage may occur, as well as localized suppurative lesions, usually at or proximal to the primary obstructive lesion and commonly resulting from secondary infection and scar deposit.

Uropathologic Picture in Urinary Obstruction.—In all forms of obstruction of the urinary tract and at all ages, injury to the kidneys is the primary vital consideration. There is not only the immediate direct back pressure effect, which leads to variable degrees of hydronephrosis, but the damage of the kidneys by complicating infection, which may be anticipated in every case of obstruction. In some instances complicating acute infection of the urinary tract or severe chronic infection is of itself fatal. As a therapeutic corollary, even though the obstructing lesion is removed the patient cannot be considered cured until the urine has been sterilized.

Fortunately, in infravesical obstructions the bladder and later the ureters act as protective buffers for variable periods and, by dilatation, spare the renal pelves the full brunt of the back pressure damage.

While the obstructive lesion exists, secondary back pressure complications, and notably diverticulum of the bladder, are of relatively common occurrence (5 per cent). Diverticulum of the urethra proximal to the obstruction may occur, as I have observed in several young boys. Urinary stasis and infection furnish ideal biophysical conditions for the development of complicating calculi, which occur in 2 to 5 per cent of the cases.

Symptoms.—The symptoms are quite similar in all types of obstruction of the lower part of the urinary tract, being characterized chiefly by frequency and difficulty of urination, often with sluggishness in starting the stream (when the obstructive lesion is at the vesical outlet) or the passage of a threadlike stream (when the external urethral meatus is constricted). Secondary infection produces pyuria; hematuria is commonly observed and may result from congestion of the obstructed passages and/or complicating infection.

As a result of the obstruction, pain in the lower abdominal or the suprapubic region may result from vesical distention, and distention of the upper part of the urinary tract may cause pain in the lateral portion of the loin or in the renal region, particularly near the costovertebral angle. As the back pressure phenomena progress, gastrointestinal disturbances occur in at least half of the patients, and with complicating acute infection the clinical manifestations of so-called pyelitis may dominate the picture. If infection does not exist or is minimal, the progressive renal damage is reflected by suburemic or uremic symptoms.

Diagnosis.—The diagnosis is readily made by complete urologic examination; phimotic stenosis or stenosis of the external urethral meatus, often with incrustation, is determined by inspection. Investigation of the deep por-

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tion of the urethra requires cystourethroscopic study for correct identification of the obstructing lesion, but preinstrumental excretory urograms, including voiding urethrocystograms commonly disclose the proximal portion of the urinary tract to be dilated and often the upper part is similarly involved Even in cases of congenital stenosis of the external urethral meatus damage due to vesical back pressure is often advanced occasionally with diverticulum formation and wide dilatation of the upper part of the urinary tract with pronounced renal injury

Congenital Stenosis of the Prepuce —Phimotic obstruction of clinical importance is comparatively rare but I know of 5 cases in the New York metropolitan area in which there was not only gangrene of the prepuce but wide distention of the entire urinary tract behind the obstruction When the condition is recognized, and this must be done early and promptly, dorsal or lateral slitting or circumcision is required

Congenital Stenosis of the External Urethral Meatus —This is an extremely common anomaly in the young of both sexes In boys it commonly accompanies a long prepuce In many boys the tight meatus become ulcerated and, as the ulcer dries, a scab forms When it cracks or is pulled off, blood appears on the clothing or may appear in the urine Among pediatricians the condition is widely accepted as a result of faulty diet, particularly as regards ingestion of fats, and is also alleged to result from ammoniacal diapers It appears chiefly in circumcised boys, but it occurs also in the uncircumcised, in whom, in the absence of evaporation of the subpreputial exudate, ulceration occurs (but without scab formation) Yet the condition is not limited to infancy and the ammoniacal diaper, I have seen it in many boys long out of diapers Difficulty in urination, often with hematuria, frequency and pain, is the usual symptom Complicating urinary infection and its manifestations as well as pain in the proximal portion of the urinary tract, are often part of the clinical picture The diagnosis is made by inspection In some cases cystourethrograms have shown the urethra to be widely dilated behind the meatal obstruction, and in at least 2 instances the bladder was not only dilated but showed a moderate sized diverticulum which developed as a back pressure blowout Dilatation of the upper portion of the urinary tract is not unusual This relatively simple but potentially grave condition should be recognized not only by pediatricians but by general surgeons, especially urologists Liberal meatotomy is the treatment of meatal stenosis in boys After wide meatotomy, the mother or nurse should be instructed to separate the meatus daily, and after ten days sounds should be passed into the anterior portion of the urethra to keep the meatus dilated to acceptable size, at least to the size of a 14 F sound in a 1-year old boy and to that of a 20 F sound in a 5 year old Despite these efforts, the meatus often grows together again and requires a repetition of meatotomy At increasing intervals of two, four to six weeks or two, four to six months, progressive dilation of the meatus is performed to be sure that the orifice remains adequately patent The treatment is completed by sterilization of the urine Congenital meatal stenosis in girls practically never requires meatotomy, periodic progressive dilation with sounds is adequate

Congenital Stricture Deeper in the Urethra —This condition is simply a congenital narrowing of the canal without local inflammatory changes except as periurethritis may have developed Anatomically these congenital strictures are analogous to the narrowings commonly seen in the intestinal, the hepatic, the ureteral, the vascular or the pulmonary tract, or even to congenital contracture of the vesical outlet The symptoms are those of obstruction as enumerated previously The diagnosis is made by the passage of small sounds, silk or olivary bougies which will be grasped, and in nearly all instances urethroscopic and urethrographic confirmation can be achieved Treatment consists of periodic progressive dilation with small sounds beginning often with a sound of filiform caliber and progressing to a size normal for the patient's age Normally a 10 F sound should readily be passed to the bladder of a 1-year old boy, a 15 F sound to the bladder of a 4 year old, and an 18 F sound to the bladder of a 10 year old Yet these sizes indicate averages, and in the female a caliber at least 2 F greater is employed The dilation is carried out at progressively length ening intervals of two, four, six or eight weeks and periodically thereafter as indicated; the stricture is cured only when it remains dilated.

Traumatic stricture: In children this is usually the result of straddle injury but may follow acts of self-mutilation, particularly by the introduction of rough foreign bodies into the urethra. Characteristically such strictures are extremely dense and do not always respond readily to periodic dilation; for this reason some must be cut. Chronic gonorrheal strictures are today extremely rare in the young and manifest themselves exactly as do congenital or traumatic strictures, although the response to instrumental dilation is usually more rapid than when the stricture is traumatic. In any event, when conservative progressive dilation with sounds is not satisfactory, urethrotomy must be performed. For anterior urethral stricture one employs internal urethrotomy, cutting on the roof; for stricture of the bulbomembranous junction, perineal or external urethrotomy. These operations, however, will be required seldom in the treatment of children.

Congenital Valves of the Prostatic Portion of the Urethra.—These are mucosal redundancies of cusplike or finlike appearance which pass (*1*) from the region of the vesical outlet anteriorly to the posterior verumontanum; (*2*) from the anterior verumontanum forward to the urethral wall; or (*3*) from any portion of the body of the verumontanum to the lateral wall. They may also appear (*4*) as transverse partial or complete diaphragms, often of the iris type. The symptoms produced are those of obstruction, and as a rule chronic vesical retention with overflow is present. In 1 of my patients, a boy 11 months old admitted to the hospital because of persistent constipation, interference with defecation was due to compression of the rectum by the chronically overdistended bladder. The child had had no bowel movements for three weeks except by enemas, and even this help was not thoroughly effective.

Enormous dilatation of the upper portion of the urinary tract commonly occurs with valvular obstruction of the urethra in its prostatic portion and, unrelieved, the renal damage due to obstructive back pressure commonly causes a fatal termination in the presence of uremia or urinary sepsis. Infection may be anticipated in all cases and is often the immediate cause of death.

The diagnosis is made by cystourethroscopic study, at which time the cusplike structures *in the prostatic portion of the urethra can* usually be made to wave back and forth by manipulation of the irrigating stream, thus disclosing their anatomic conformation. These valves are to be sharply distinguished from normal or even slightly enlarged frenulae of the prostatic urethra, which commonly extend from the vesical outlet to the verumontanum and also forward from the anterior end of *the verumontanum; yet these do not* obstruct. In valvular obstruction the verumontanum is usually anomalous, being three to four times its normal length, and variably fills the prostatic portion of the urethra. Treatment consists of transurethral resection of the obstructing valves, employing the 16 F miniature resectoscope either through the anterior portion of the urethra or through a perineal boutonniere (external urethrotomy). This method of excision entails little or no shock and negligible bleeding. An indwelling catheter is left in the bladder for forty-eight hours and is then removed. When the condition of the child is desperate or far advanced, preliminary cystotomy drainage should precede transurethral resection of the valves and should be maintained until renal and general physiologic stabilization have been achieved. For protracted drainage, cystotomy rather than the indwelling catheter should be employed. Yet I have proceeded at once with transurethral removal of the obstruction in many children with a large vesical residuum and minimal infection.

Congenital Hypertrophy of the Verumontanum.—This anomaly is the result of cellular enlargement rather than cellular multiplication. The organ frequently becomes five to six times the normal size, fills the prostatic portion of the urethra and in several boys has extended back into the vesical outlet as a finger-like ball-valve projection. The symptoms and pathologic changes in the upper part of the urinary tract are those common to the obstruction of the vesical neck. The diagnosis is made cystourethroscopically, and transurethral resection of the verumontanum is the treatment In many instances it is sufficient to remove one or two deep longitudinal grooves down the midline of the hypertrophic verumontanum, after which the organ will contract and cease to obstruct Complete excision of the verumontanum is seldom if ever indicated In the conservative procedure the ejaculatory ducts may be sealed off to induce sterility, but sufficient time has not elapsed and sufficient opportunity has not been offered for observation from which substantial conclusions can be drawn I have been able to perform a recheck examination in only 1 instance, the case of a boy whose enormous verumontanum was reduced by electrocoagulation more than fifteen years ago His premarital examination failed to show sperm His left testicle had been congenitally ectopic in the perineum and was replaced in the scrotum A No 3 F catheter could be passed 2 cm up the left ejaculatory duct but would not enter the right duct Yet in these cases the urethral obstruction is grave, the patient's life is in jeopardy and, unless the blockage is eradicated, premature death will remove the problem of reproduction from the picture

Congenital Contracture of the Vesical Outlet —Contracture of this type occurs in both sexes, although it is more commonly recognized in the young male patient in whom the prostate itself is not primarily involved In contracture of the vesical outlet the orifice is considerably reduced in caliber sometimes nearly to pinhole size The lesion is predominantly a congenital narrowing of the vesical end of the urethra in a manner analogous to congenital stenosis of the external urethral meatus and congenital narrowings of the ureters and of the enteric and biliary tracts In the absence of inflammation there is no true sclerosis but histologically in most cases a submucous fibrosis is demonstrable The symptoms are those previously described and resemble in all respects the manifestations of prostatism in the adult male Back pressure dilatation of the bladder and the upper part of the urinary tract is often extreme The diagnosis is made by cystourethroscopic study by which means the concentric collar like contraction of the vesical outlet is easily seen In the male the declivity between the vesical outlet and the verumontanum rises sharply to afford the picture of median bar obstruction On the vesical side, the anterior trigone falls away abruptly in bas fond formation, with variable but usually marked hypertrophy of the trigone engendered by the increased effort required to pull open the vesical outlet The interureteric bar is usually greatly thickened, and behind this a deep bas fond of the bladder floor is seen Trabeculation varies from moderate to extreme and often is associated with extensive saccule, cellule and even diverticulum formation

The recommended treatment is transurethral resection of the vesical outlet employing the 16 F miniature instrument, I prefer the Nesbit model, which permits the detecting finger to be introduced into the rectum at the time the vesical outlet is resected In performing the resection, all obstructing tissue should be removed with due care not to perforate the vaginal roof in the female or the rectum in the male With the finger in the male rectum, the tissue between the vesical neck and the rectal mucosa feels as thin as cigarette paper, and if there is some question as to how much tissue to remove it is always better to err on the side of removing too little, more tissue can be removed at a later date if the patient cannot empty his bladder readily and completely

The amount of tissue removed must be sufficient to relieve the obstruction, no attempt is made to remove the prostatic tissue down to the prostatic capsule as is the objective in the adult male When the operation is completed the floor of the posterior part of the urethra should be isoplanic with the anterior trigone This may require removal of only four or five generous pieces of vesical neck but sometimes it is necessary to excise as many as ten or fifteen pieces In 1 boy with difficulty and frequency of urination the vesical outlet was obstructed by *a large polypoid tumor that* originated on the roof of the prostatic urethra and extended backward well into the bladder causing blockage by ball valve action It was removed by suprapubic excision As a rule, in transurethral resection in the young, bleeding is mild, an inlying catheter is employed for twenty four to forty-eight hours I have performed this operation on boys as young as 4 months and on several under 2 years of age, in whom the perineal route (external ure throtomy) was employed because of an extremely small anterior urethra. Moreover, I have done the operation several times on girls.

Neuromuscular Vesical Disturbance.—Here we are concerned with the sphincterospastic type of obstruction of the vesical outlet in which the neurologic disturbance or dysfunction is usually consequent to congenital spinal malformation, such as advanced spina bifida occulta, spina bifida, meningocele, myelocele, meningomyelocele, sacral dermoid, teratoma or cyst. Rarely it may be due to trauma. In this variety of neuromuscular disease the vesical outlet (internal sphincter) is hypertonic, with considerable hypertrophy of the internal sphincteric musculature. The cystoscopic picture closely resembles and is sometimes indistinguishable from that of congenital contracture of the vesical outlet. In such cases the differential diagnosis must rest upon (*1*) roentgenologic demonstration of spinal defects, (*2*) neurologic examination, which demonstrates somatic disturbances and particularly saddle anesthesia of the perineum with perianal involvement, and/or (*3*) cystometric study in which the curve is that of diminished sensation and greatly increased capacity. Cystoscopically the bladder wall often shows the fine trabeculation of neurotrophic disturbance, but coarse trabeculation with cellule and saccule formation is sometimes seen. In this variety of neuromuscular disturbance, functional improvement is sometimes achieved by neurosurgical methods. This generally includes liberation from fibrous compression or bony impingement of the nerves that eventually supply the bladder. Improved vesical emptying can usually be achieved by transurethral resection of the vesical outlet in the same manner described under congenital contracture of the vesical neck. In general, the operation should be more conservative than that for congenital contracture, with removal of less tissue. Canalization of the inferior vesical segment at 6 o'clock often suffices. Should it be found that inadequate tissue has been removed and a large vesical residuum remains, additional tissue excision must be carried out; yet vesical emptying is often achieved by the administration of cholinergic drugs, such as acetylcholine and urocholine. In some cases dysfunction of the vesical neck will persist despite the aforedescribed surgical therapy, and, if a large amount of residual urine remains, prolonged suprapubic cystostomy, sometimes permanent, must be instituted.

Other infravesical lesions blocking the vesical outlet are sometimes observed in children, particularly trigonal curtain obstruction and enormous ureterocele extending down to obstruct the vesical outlet and in the female even prolapsing through the entire urethra. Prostatic sarcoma is a rare condition that causes progressive and complete vesical neck obstruction. I have seen the condition in 4 boys under the age of 5 years and in 2 others in the late teens. As a rule the prognosis is death in four months from the time the diagnosis is made. In 2 of my cases radical excision of the bladder and prostate was carried out, together with bilateral cutaneous ureterostomy based on the expectation of reimplanting the ureters into the bowel should the patient appear cured of the tumor. In a 2-year-old boy thus treated five months ago and showing a rapidly growing fibromyxosarcoma, recurrence appeared one year later in the stump of the transplanted right ureter. In a 5-year-old boy with a rapidly growing fibrosarcoma of the prostate, complicating acute suppurative left pyelonephritis requiring nephrectomy was fatal two weeks after the operation. The boy could not tolerate sulfa drugs, was streptomycin-fast and showed diminution in his hyperacute infection (Escherichia coli and Aerobacter aerogenes) only after the administration of aureomycin. Yet this drug induced such profound vomiting that it had to be discontinued; at the time, intravenous aureomycin was not available.

SUMMARY

Congenital obstructive lesions of the urethra are relatively common, particularly stenosis of the external urethral meatus. All of these lesions cause essentially the same symptomatic picture, chiefly frequency and difficulty of urination, often complicated by infection and followed, if unrelieved, by terminal uremia. Diagnosis is readily made by complete urologic examination. Urethral dilation is usually adequate in the treatment of urethral strictures; the lesions described as occurring in the prostatic portion of the urethra and at the vesical

outlet readily respond to transurethral resection Only by clinical alertness to the frequency and potential gravity of these conditions and by prompt diagnosis and treatment can a child be afforded hope of cure and the preservation of a more or less normally functioning urinary tract In general the clinical and therapeutic problems are comparable to those of prostatic obstruction *in adults*

RESUMÉ

Les lésions obstructives congenitales de l'uréthre sont relativement frequentes surtout la sténose du méat uréthral externe Toutes ces lésions déterminent essentiellement les *mêmes* symptômes, principalement la frequence et la difficulté d'uriner souvent compliquées par l'infection et suivies aussi si non soulagées, par l'urémie Le diagnostic est facilement fait par un examen urologique complet La dilatation de l'uréthre est ordinairement adéquate pour le traitement dans le retrécissement uréthral Les lésions decrites survenant dans la partie prostatique de l'uréthre et à l'ouverture vesicale cedent à une résection transuréthrale Ce n'est que par une alerte clinicale de la fréquence et de la gravite potentielle de ces conditions et par leur diagnostic et leur traitement prompts qu'on peut espérer guérir et conserver un systeme urinaire fonctionnant plus ou moins normalement En général, les problèmes cliniques et thérapeutiques sont analogues à ceux qu'on rencontre dans l'obstruction prostatique chez les adultes

RIASSUNTO

Le anomalie congenite a carattere ostruttivo dell'uretra sono relativamente comuni in modo speciale, la stenosi del meato uretrale esterno Tutte queste anomalie danno luogo agli stessi sintomi principalmente a disuria e pollachiuria, spesso complicate da infezioni e—se non curate—ad un'uremia terminale La diagnosi viene posta con facilita' da un esame urologico completo La dilatazione uretrale e' generalmente sufficiente per ovviare ad un restringimento uretrale Le lesioni situate al livello della porzione prostatica dell'uretra e dello sbocco vescicale rispondono bene ad una resezione transuretrale

La speranza di una guarigione e la conservazione di una funzione urinaria piu' o *meno* normale sono affidate—*nei* bambini—*ad* una diagnosi pronta e ad una cura tempestiva

I problemi clinici e terapeutici sono—*fino* ad un certo punto—simili a quelli *che ricorrono* nell ostruzione prostatica degli adulti

La frequenza e la potenziale gravita' di queste anomalie vanno tenute sempre presenti

ZUSAMMENFASSUNG

Angeborene Verschluesse der Harnroehre sind verhaeltnismaessig haeufig, besonders die Verengung des aeusseren Harnganges Alle derartigen Veraenderungen rufen im wesentlichen das gleiche Symptomenbild hervor, es besteht vor allem in Haeufigkeit und Schwierigkeit des Harnlassens, ist oft kompliziert durch Infektionen und endet in unbehandelten Faellen mit Uraemie Die Diagnose wird ohne Schwierigkeiten durch eine vollstaendige urologische Untersuchung gestellt Harnroehrendehnungen *reichen gewoehnlich aus zur* Behandlung von Harnroehrenstrikturen, die Veraenderungen, die in der Portio prostatica der Harnroehre und am Blasenausgang beschrieben werden, sind der transurethralen Resektion leicht zugaenglich Nur durch klinische Wachsamkeit gegenueber der Haeufigkeit und der moeglichen ernsten Entwicklung solcher Erkrankungen und durch unverzuegliche Diagnose und Behandlung ist es moeglich einem Kind Hoffnung auf Heilung und die Erhaltung eines mehr oder weniger normal funtionierenden Harnsystems zu sichern lich, einem Kind Hoffnung auf Heilung und therapeutischen Probleme mit denen der Prostataobstruktion beim Erwachsenen verglichen werden

RESUMEN

Las lesiones obstructivas congénitas de la uretra son relativamente frecuentes, especialmente la estenosis del meato uretral externo Todas estas lesiones causan fundamentalmente el mismo cuadro sintomático caracterizándose por la frecuencia y dificultad en la micción, complicada a menudo por infección si no se trata de una uremia terminal El diagnóstico se hace facilmente mediante un examen urologico completo La dilatación uretral generalmente es apropiada para el tratamiento de las estenosis uretrales, describiendose las le siones como localizadas en la porción prostática de la uretra y en su unión con la vegiga urinaria y respondiendo fácilmente a la resección transuretral. La única esperanza de curación y conservación de un tracto urinario más o menos normal en su funcionalismo en los niños que presentan esta afección, reside en que el clínico esté alerta en cuanto a la frecuencia y posible gravedad de este proceso. En general, los problemas clínicos y terapéuticos en este caso son comparables a los de la obstrucción prostática en los adultos.

Wisdom at Work

One machine can do the work of fifty ordinary men. No machine can do the work of one extraordinary man.—Hubbard

If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them.—Thoreau

If you want knowledge, you must toil for it; if food, you must toil for it; and if pleasure, you must toil for it; toil is the law.—Ruskin

It is easier to fight for one's principles than to live up to them.—Adler

Distrust all in whom the impulse to punish is strong.—Nietzsche

It is better to wear out than to rust out.—Cumberland

Blessed is he who has found his work; let him ask no other blessedness.
—Carlyle

Violence does even justice unjustly.—Carlyle

The good man is Nature's creditor, giving her back better life than he had of her.
—Seneca

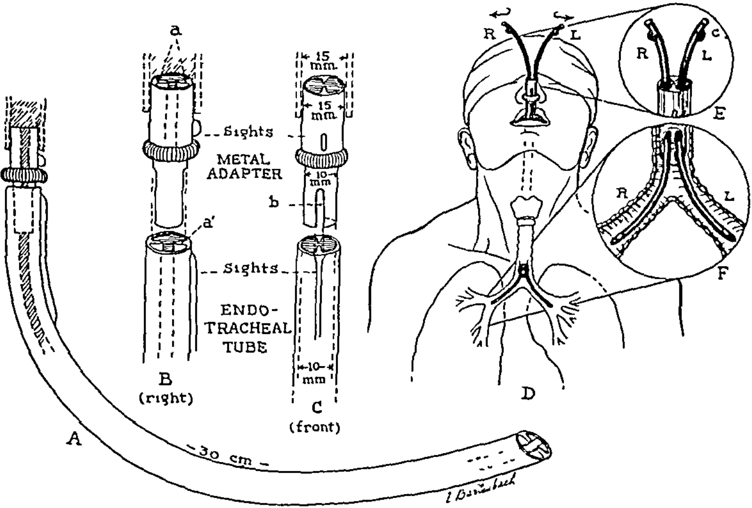
New Endotracheal Tube

A Preliminary Report

ZIGMORE HARRIS M D F I C S (Anesth)* AND
JACOB A GLASSMAN M D A I C S†
CHICAGO

THERE are two effective ways of aspirating retained secretions from the tracheobronchial tree The bronchoscope has long been employed for viewing the trachea and bronchi and removing entrapped secretions To introduce a bronchoscope during the operation requires one skilled in the procedure and is not entirely without danger A bronchoscopic procedure may necessitate interrupting the operation or deepening the anesthesia

A simpler and more common method of aspirating bronchial secretions is the passage of a long rubber catheter through the endotracheal tube with a suction apparatus attached to its upper end This method of aspiration is a blind one The anesthetist never knows in which bronchus the tip of the catheter is lying The procedure does not allow systematic and com-



New endotracheal tube A side view (actual size) B, right view Metal adapter sight aligned to rubber tube sight, a a', septums of rubber endotracheal tube aligned with metal and rubber sights C, front view Note slots in adapter which permit effective connection between metal adapter and rubber tube D, diagrammatic sketches showing long rubber suction catheters with sights (c) at upper ends and curved rubber tips at lower ends Sights at upper ends aid in aligning curved tips of long rubber catheters with right or left bronchus Septums of endotracheal tubes help guide long rubber catheter tips correctly into right or left bronchus E and F, detailed enlargements.

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plete aspiration and is therefore inadequate.

We have designed a modified endotracheal tube which we believe will simplify and improve endobronchial aspiration (see illustration). This tube obviates the need of bronchoscopic work in many instances and enables the anesthetist to aspirate retained bronchial secretions from either the right or the left bronchus effectively and with certainty. We believe our new endotracheal tube offers the following advantages over bronchoscopic and blind-catheter aspiration technics:

1. The anesthetist is certain of the exact position of the catheter tip in the bronchial tree.
2. The anesthesia and the operative procedure continue throughout the aspiration.
3. Injury to the trachea and bronchi caused by a forced and misdirected catheter is avoided.
4. A more complete and systematic aspiration of secretions from the right and left bronchus is made possible.
5. Lipiodol instillation is accomplished with ease and accuracy.
6. Aspiration by a rubber catheter is less traumatic than with a metallic bronchoscope.
7. The necessity for specialized bronchoscopic procedures is reduced.*

UN TUBE ENDOTRACHÉAL MODIFIÉ

Il y a deux moyens efficaces d'aspirer les sécretions retenues dans l'arbre trachéobronchial. Le bronchoscope depuis longtemps est employé pour examiner la trachée et les bronches et aussi pour faciliter l'enlèvement des sécrètions. L'introduction du bronchoscope durant l'acte opératoire demande de l'expérience et n'est pas entièrement sans danger. Le procédé bronchoscopique peut nécessiter au l'interruption de l'opération ou qu'on approffondisse l'anesthésie.

Une méthode plus facile et plus répandue pour aspirer les sécretions bronchiales, est le passage d'un long cathéter en caoutchouc dans le tube endotrachéal; la partie supérieure du tube est attachée à un appareil à suction. Cette méthode d'aspiration est une méthode aveugle. L'anèsthésiste ne sait jamais dans quelle bronche le bout du cathétèr est placé. Ce procédé ne permet pas une aspiration complète.

Nous avons proposé un tube endotrachéal modifié qui, nous croyons, simplifie et améliore l'aspiration endotrachéal (voyez l'illustration). Ce type ne néccceciste pas l'emploi du bronchoscope dans beaucoup de cas. Dans plusieurs cas, il permit à l'anesthesiste d'aspirer les sécrétions bronchoéales retenues, ou dans la bronche droite ou dans la bronche gauche avec efficacité et avec certitude. Nous croyons que notre nouveau tube endotrachéal possède les avantages suivants sur la technique bronchoscopique sur celle de l'aspiration par le aveugle.

1. L'anesthésiste est certain de la position exacte de l'extrémité du cathéter dans l'arbre bronchéal.
2. L'anesthésie et l'opération continuent durant le cours de l'aspiration.
3. Les blessures de la trachée et des bronches, que peut causer l'introduction forcée du catheter, peuvent être évitéses.
4. Une aspiration plus complète et systématique des sécrétions des bronches droite et gauche est possible.
5. L'instillation de Lipiodol s'accomplit avec facilité et avec exactitude.
6. L'aspiration par un cathétèr en caoutchouc est moins traumatisante qu'avec un bronchoscope métallique.
7. La nécessité de procédure pour l'examen spécialisé avec le microscope est décrite.*

NUEVO TUBO ENDOTRAQUEAL: INFORME PRELIMINAR

Existen dos maneras efectivas de aspirar las secreciones retenidas en el árbol tráqueobronquial. Por largo tiempo se ha empleado el broncoscopio para examinar la tráquea y los bronquios y para remover las secreciones de los mismos. Para introducir un broncoscopio durante una intervención quirúrgica, se requiere una persona adiestrada en este procedimiento y, aun así, no se está enteramente libre de peligro. Un procedimiento broncoscópico puede necesitar la interrupción de la operación o una anestesia más profunda.

Un método más simple y más corriente de aspirar las secreciones bronquiales es el paso

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*The preliminary model for this new endotracheal tube is being completed. Further details may be obtained from the authors.

*Le modele préliminaire de ce nouveau tube endotrachéal est en voie d'achèvement. Les details supplémentaires peuvent être obtenus de l'auteur.

de un cateter de caucho largo a través del tubo endotraqueal con un aparato de succion adjunto a su extremo superior Este metodo de aspiración se hace a ciegas, ya que el anestesista nunca sabe en que bronquio descansa la punta del cateter El procedimiento no permite una aspiración sistemática y completa y por lo tanto es inadecuado Hemos diseñado un tubo endotraqueal modificado que creemos simplificará y mejorará la aspiracion endobronquial (véase la ilustracion) Este tubo evita la necesidad de la broncoscopia en muchos casos y permite al anestesista aspirar las secreciones bronquiales retenidas en los bronquios derecho o izquierdo de modo efectivo y con certeza Opinamos que nuestro nuevo tubo endotraqueal posee las siguientes ventajas sobre las técnicas de aspiracion broncoscópicas y del cateter a ciegas

1 El anestesista está seguro de la posicion exact de la punta del cateter en el arbol bronquial

2 La anestesia y el procedimiento operatorio continúa a través de la aspiracion

3 Se evita el lesionar la traquea y los bronquios debido a un cateter forzado y mal colocado

4 Se facilita una aspiracion más completa y sistémica de las secreciones de los bronquios derecho e izquierdo

5 La instilación de lipiodol se realiza con facilidad y precisión

6 La aspiración por medio de un cateter de caucho es menos traumatica que con un broncoscopio metálico

7 Se reduce la necesidad de los procedimientos broncoscópicos especializados *

EINE NEUE ENDOTRACHEALE ROEHRE

VORLAEUFIGER BERICHT

Es gibt zwei wirksame Wege der Absaugung von Sekretverhaltungen aus dem Tracheobronchialbaum Das Bronchoskop ist lange angewandt worden um die Luftroehre und die Bronchien zu inspizieren und eingeklemmte Absonderungen zu entfernen Ein Bronchoskop waehrend einer Operation einzufuehren erfordert eine mit dem Verfahren vertraute Person und ist nicht ganz ungefaehrlich Eine bronchoskopische Prozedur kann eine Unterbrechung der Operation oder eine Vertiefung der Narkose notwendig machen

Eine einfachere und ueblichere Methode Bronchialsekrete anzusaugen besteht in der Einfuehrung eines langen Gummikatheters durch das Endotrachealrohr, an dessen oberen Ende ein Saugapparat angeschlossen ist Dies ist eine blinde Ansaugungsmethode Der Narkotiseur weiss nie, in welchem Bronchus die Spitze des Katheters liegt Das Verfahren gestattet keine systematische und vollstaendige Absaugung und ist daher unzureichend

Wir haben ein modifiziertes Endotrachealrohr entworfen das wie wir glauben, die endobronchiale Absaugung vereinfacht und verbessert (siehe Abbildung 1) Dieses Rohr macht die Notwendigkeit einer Bronchoskopie in vielen Faellen ueberfluessig und versetzt den Narkotiseur in die Lage, die verhaltenen Bronchialsekrete entweder aus dem rechten oder aus dem linken Bronchus wirksam und sicher anzusaugen Wir sind der Meinung, dass unser neues Endotrachealrohr gegenueber der bronchoskopischen Ansaugung und gegenueber der mit einem blinden Katheter ausgeuebten Methode folgende Vorteile hat

1 Der Narkotiseur ist der genauen Lage der Katheterspitze im Bronchialbaum sicher.

2 Narkose und Operation werden waehrend der Ansaugung ununterbrochen fortgesetzt

3 Eine Verletzung der Luftroehre und der Bronchien durch gewaltsame und falsch geleitete Einfuehrung des Katheters wird vermieden

4 Eine vollstaendigere und systematischere Ansaugung der Sekrete aus dem rechten und linken Bronchus wird ermoeglicht

5 Lipiodol kann mit Leichtigkeit und Genauigkeit eingefuehrt werden

6 Die Ansaugung durch einen Gummikatheter ist weniger traumatisch als die durch ein metallisches Bronchoskop

7 Die Notwendigkeit spezialisierter bronchoskopischer Verfahren wird herabgesetzt *

UN NUOVO TUBO ENDOTRACHEALE

L'aspirazione di secreti stagnanti nell'albero tracheo bronchiale puo' essere effettuata col

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*El modelo preliminar de este nuevo tubo endotraqueal se está terminando Pueden obtenerse más detalles de los autores

*Das vorlaeufige Modell dieses neuen Endotrachealrohres wird zur Zeit fertig gestellt Weitere Einzelheiten sind bei den Verfassern erhaeltlich

broncoscopio e con un tubo endotracheale. L'inserzione del broncoscopio durante un intervento operativo richiede pero' personale specializzato e non e' completamente esente di pericoli. La broncoscopia puo' richiedere l'interruzione dell'operazione, oppure un'anestesia piu' profonda.

Il passaggio di un catatere di gomma nel tubo endotracheale, collegato ad un apparecchio di aspirazione, e' una procedura piu' semplice ma cieca. L'anestetista non e' mai in grado di sapere in quale bronco si e' infilata la punta del catetere. L'aspirazone non e' d'altra parte completa: spesso e' insufficiente.

Ecco perche' l'A. ha ideato un nuovo tubo endotracheale che semplifica e migliora l'aspirazione bronchiale. Il tubo elimina spesso la necessita' di una broncoscopia, mentre offre all'anestetista la sicurezza di un'aspirazione completa sia del bronco destro, sia del bronco sinistro.

I vantaggi di questo nuovo tubo sono
seguenti:

1. La posizione del tubo nell'albero br
chiale e' esattamente nota all'anestetista.
2. L'anestesia e l'operazione procedono
disturbate durante le manovre di aspirazio
3. Non esiste il pericolo di offendere
trachea ed i bronchi da un'introduzione f
zata o sbagliata del catetere.
4. L'aspirazione dei secreti dal bronco d
tro o sinistro e' piu' completa.
5. L'instillazione di Lipiodol puo' ess
effettuata facilmente ed accuratamente.
6. L'aspirazione con un catetere di gom
e' meno traumatica del broncoscopio.
7. Viene ridotta la necessita' di ricorrer
personale specializzato per la broncoscopia.

Il modello preliminare del nuovo tubo endotrach
e' completato. Ulteriori dettagli possono essere richi
all'A.

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Preoperative and Postoperative Nutrition for Surgical Patients with Carcinoma of the Large Bowel

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PHILADELPHIA

THE development of new and puissant materials for the control and improvement of nutrition in the cancer patient has proved to be one of the greatest contributions to gastrointestinal surgery. Discoveries in alimentation in the past few years have not only afforded more patients the benefit of operation and signally reduced mortality rates, but they have, perhaps more significantly, led us to the threshold of an era in which the guesswork pertaining to individual specific nutritional requirements and all uncertainty regarding the measures by which these needs can be met will be eliminated. At present, scientific evaluation of nutrition in the average patient facing operation is far from sufficient, and we must be content with what laboratory facilities can be brought to bear, together with our experienced clinical judgment. In the ways and means of administering needed nutriment we find ourselves in a somewhat more enlightened position. Indeed it is now quite possible to supply the usual malnourished cancer patient with a surplus of utilizable protein and carbohydrate foods by either the oral or the parenteral route. It is the unusual patient who presents a feeding problem refractory to modern management.

Protein Deficiency.—Numerous investigations by various groups have demonstrated malnutrition in patients with cancer of the gastrointestinal tract. Without exception these forms of undernourishment reflect themselves in blood and tissue protein loss. Restoration of protein, more than any other factor, reverses malnutrition. The evaluation of protein losses is not easy. Blood protein concentrations can be determined by laboratory methods with comparative simplicity, but tissue protein estimations, the more important of the two evaluations, are difficult to make with any degree of accuracy and must depend upon careful clinical judgment.

Hypoproteinemia is present with malnutrition in the cancer patient. Ariel[1] observed hypoproteinemia in 59 of 100 patients with gastrointestinal cancer. One of us (H. E. B.), with his co-worker[2] determined that 22 of 74 consecutive patients (29.7 per cent) with cancer of the sigmoid and rectum presented hypoproteinemia with protein levels of less than 6.5 Gm. per hundred cubic centimeters. Meyer and Kozell[3] reported that 29.3 per cent of their patients with gastrointestinal cancer were hypoproteinemic. In 1943 Binkley and his associates[4] disclosed that 23 patients of a group of 65, or 36 per cent, had plasma protein levels of less than 6.5 per cent per hundred cubic centimeters. Of these 65, 60 had apparently maintained adequate protein intake.

Among the causes for malnutrition in the cancer patient the following factors have been most commonly postulated:

1. Lack of proper dietary and vitamin intake.
2. Poor absorption.
3. Loss of fluid and food as a result of vomiting or diarrhea.
4. Hepatic dysfunction.
5. Repeated hemorrhage.
6. Protein loss through exudation from ulcerating lesions.
7. Increased catabolism of protein.
8. Effect of cancer in preventing normal production of serum protein.[5]

Minot[6] has asserted that "defective nutrition can arise when the diet seems adequate because of some disturbance in the state of the gastrointestinal tract and its contents, which may act adversely to 'condition' or enhance a deficiency of nutritional factors within the body proper."

Perhaps a less appreciated factor is poor dietary habits in persons of the age group in which cancer most frequently occurs. Kelly and Sheppard[7] and also Youmans[8] and his

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associates have demonstrated that many otherwise normal persons fail to avail themselves of proper diet. It is also well known that middle-aged persons in general have a tendency toward obesity. Self-invented reducing diets are not uncommon, but striking protein and vitamin deficiencies are frequent even in obese persons.

Mann and Stare[9] pointed out that "an appreciation of the nutritional aspects of disease has been handicapped by two principal concepts: 1. The medical profession has been (and unfortunately in most quarters still is) trained to think of nutritional deficiencies in terms of overt and florid physical manifestations; for example, the flagrant signs of beriberi or scurvy. 2. The profitable returns from production and exploitation of nutritionally active substances have caused great pressure to be brought on both the patient and physician, encouraging them to believe that many common physical disorders can be prevented and cured by profuse vitamin, mineral or protein medication. This philosophy exists at the expense of sound food habits in the home and sound nutritional diagnosis and therapy in the hospital and physician's office." In considering the cancer patient these concepts are especially applicable. It is a common occurrence to find poor nutritional conditions overlooked simply because the patient, clinically speaking, does not present the typical or textbook appearance of a deficiency state. This is well illustrated by a patient with cancer of the large bowel who has lost weight but clinically seems to be in a good state of nutrition. At operation a far different picture manifests itself. Blood pressure is found to be very unstable and far out of proportion to the actual blood loss.[10] Surgical intervention is poorly tolerated. The postoperative course is prolonged, with delayed wound healing. Complications are numerous. Autopsy in such a case[10] usually shows incipient heart failure and bronchopneumonia, fatty liver and failure of wound healing.

The second concept has not infrequently been a factor in the failure to diagnose cancer. Consider, for example, the patient whose presenting complaints are anorexia, weakness and loss of weight. It is far too easy for the busy physician to overlook the possibility of malignancy in his enthusiasm to administer vitamins, protein hydrolysates or whatever other ambrosial comestible the "detail man" has projected into his armamentarium.

Vitamin deficiency states are uncommon in the general population at present, according to Culver's recent (1949) comprehensive review.[11] Culver questions the need for widespread consumption of purified vitamin supplements and finds that "the minimal requirements for the vitamins essential to man are much less than the recommended dietary allowances." Differing somewhat from this view is the testimony offered in the hearings held by the Food and Drug Administration which resulted in recent new Federal standards for enriched flour. This testimony supported the view that the average American diet does not furnish sufficient amounts of some essential vitamins and minerals to insure the public health so far as these dietary factors are concerned.[12] Our experience has demonstrated that patients with cancer of the large intestine improve upon vitamin supplementation of their diet, and it is our practice to administer these in more than adequate dosage in the preoperative period.

Detection of Protein Deficiency.—We have already referred to the difficulty in evaluating protein deficiency, and we are in complete agreement with Murphy,[13] who asserts that preoperative estimation of the degree of undernutrition depends more upon clinical acumen than upon laboratory studies. We may go far in reducing "unknowns" by a well-planned study of the preoperative state. Following the routine outlined by Lund and Levinson,[14] the following data will yield a critical and simplified assessment:

(1) Optimum weight of patient
(2) Observed weight of patient
(3) Plasma protein level
(4) Plasma albumin level
(5) Plasma volume
(6) Nitrogen intake
(7) Nitrogen output

Interpretation of these observations in terms of protein and caloric requirements is usually not difficult, but one must be certain that the true values for each item have been obtained. Weight evaluation may be distorted by the presence of edema. Plasma protein levels will vary when acute changes are superimposed upon chronic deficiencies For example, the patient with gastrointestinal cancer may have episodes of diarrhea with a concomitant loss of fluids and protein Dehydration ensues and blood plasma protein levels will be found to approach normal

Blood volume determinations will greatly serve to correct such discrepancies and should be employed without hesitation when indicated As pointed out by Beling Morton and Bosch,[15] shrunken total blood volume with deficits of plasma, hemoglobin and cells circulating plasma proteins and body proteins may be extant Usual estimations of hemoglobin hematocrit and plasma proteins will not disclose these deficits Beling and his co-workers[15] outlined a routine for accurate appraisal of such deficiencies They found that if values are obtained for the specific gravity of plasma and whole blood and of the circulating plasma and whole blood volumes with dye T 1824 (Evans' blue) and calculated by simple arithmetic with the patient's weight, it is possible to estimate the patient's need for one or more of the components of the circulating blood

In cases of chronic illness the presence of hypoproteinemia indicates a large tissue protein loss Estimates for this vary, but Elman[16] indicates that 30 Gm of protein has been lost from the tissues when a deficiency of 1 Gm in the albumin fraction of the plasma is reported by laboratory methods Even higher ratios of plasma to tissue protein are reported [17]

Youmans[18] considers certain important distinctions necessary in making a diagnosis of protein deficiency The results of deficiency in the diet must be differentiated from the physical state of deficiency of protein in the body An inadequate intake of protein must be great enough and have persisted long enough to exhaust the reserve stores before such a diagnosis can be based upon this factor alone Distinctions must be made between protein deficiency as protein and protein deficiency as amino acids Specific amino acid shortages occur

Undoubtedly diagnostic limitations prevail as to both history and physical examination Nutritional edema is a rather signal physical indication, but this important implication occurs only in advanced states With the application of laboratory observations to the evaluation of the history and physical examination plus clinical judgment, the deduction is complete

Preoperative Nutrition—In the preoperative patient it is advantageous to correct nutritional deficiencies by the oral route wherever possible This avenue for the administration of nutriment is unsurpassed, despite great strides now apparent in parenteral alimentation Studies by Keep, Riegel, Grigger and Barnes[1] have interestingly demonstrated that when similar protein hydrolysate mixtures are given orally and parenterally, patients receiving oral feedings are more easily maintained in nitrogen balance Mok, Kozoll and Meyer supported this view by studies [9] in which they discovered that oral administration of amino acids is superior to intravenous amino acids for securing positive nitrogen balance

To insure optimal preoperative nutrition with the usual hospital diet, it is important that the surgeon acquaint himself with the patient's eating habits and the extent to which he partakes of the food provided A surprise may be in store, because it is all too true that preoperative patients left on their own fare poorly Appetite, unlike thirst, does not increase in proportion to tissue requirements Anorexia indeed, is characteristic of the malnourished person [10] Tui and his co-workers,[21] in a study of dietary practices at Bellevue hospital, observed that the voluntary intake of hospital food will not keep a cancer patient in nitrogen equilibrium Considerable urging on the part of physicians and nurses is necessary despite the serving of food with unusual sapority Special nursing care is of great value but economically disadvantageous

Most modern preoperative diets are high in proteins and carbohydrates and low in residue These are supplemented by between meal feedings of one of the many commercial protein concentrates or amino acid mixtures, with added carbohydrate usually in the form of dextrimaltose Amounts of protein varying from 50 to 150 Gm are thus added to the basic hospital diet.

Skimmed milk powder is an excellent means of protein supplementation It is easily obtained and inexpensive Patients find it palatable when mixed with fruit juices, ginger ale, or eggnog It can be added to soups and cereals. Its composition is as follows:[10]

Protein	37.8 per cent
Casein	32 per cent
Lactalbumin	5.2 per cent
Lactoglobulin	0.5 per cent
Carbohydrate	49.7 per cent
Fat	1 per cent
Water	3 per cent
Ash	8.5 per cent

Skimmed milk powder is rich in the liver-protecting amino acid, methionine.

It has been our experience[22] that a low residue diet consisting of 400 Gm. of carbohydrate, 100 Gm. of protein and 100 Gm. of fat, supplemented by 60 to 80 Gm. of protein concentrate or hydrolysate, resulted in an appreciable degree of weight gain. This diet provided from 3,140 to 3,220 calories with 1.5 to 2 Gm. of protein per kilogram of body weight.

Not uncommonly it is necessary to correct malnutrition more rapidly. A number of methods are available for this procedure, but certain principles must be fulfilled before proper protein utilization can occur. The most important of these is the necessity of supplying an adequate caloric intake. With a high protein intake it is estimated[24] that 50 to 60 calories per Kg. of body weight must be administered. A suitable diet for restoration of a high protein level is recommended by Varco:[10]

6 eggs	
2 egg whites	
Skim milk powder	120 Gm.
Lactose*	300 Gm.
Skimmed milk	100 Gm.

The patient is urged to take 3 liters of this mixture per day which amounts to about 5,000 calories. Five to seven days of this regimen are prescribed for each 10 per cent of body weight lost.

Spence, Evans and Forbes[24] recommend a high protein liquid diet composed of the following ingredients:

Powdered whole milk	150 Gm.
Dehydrated beef and liver mixture	150 Gm.
Corn oil	50 Gm.
Sucrose	150 Gm.
Dextrimaltose	150 Gm.
Chocolate	35 Gm.
Water	1,000 cc.

This can be given by mouth over twenty-four-hour periods and will supply 3,000 calories.

Tube Feeding.—Sometimes unpleasant taste and other factors interfere with oral administration. Tube feeding is fairly simple and is very effective for providing high protein alimentation.

A good deal of comfort in tube feeding depends upon the method employed. To avoid nasal trauma and discomfort we have inserted a tube of Penrose drain tubing. This feeding tube is of thin pliable rubber and may be made from a two foot segment of the 3/8 inch (1.9 cm.) size. A silk ligature is placed at one end. Several cubic centimeters of mercury are then introduced into the other end and allowed to pool at the ligated extremity. About 1 inch (2.5 cm.) above this pool a second silk ligature is placed. Above this, several holes are made in the tubing to allow for the passage of the food mixture.[25] The tube is easily passed through the nose, and the mercury causes it to slide rapidly by gravitation into the fundus of the stomach. The tube is anchored with its tip in the stomach and is not permitted to work its way toward the pylorus. A homogenous liquid nutriment mixture is desirable. (The use of a mixmaster or other mechanical mixing device is recommended.) Instead of setting up the usual flask with an opening at the top, it is advised that the air vent be at the bottom, as is the case with intravenous flasks. This will allow air bubbles to pass through the liquid and keep it in a state of agitation.

Elman[26] suggests that 20 Gm. each of a simple carbohydrate and a protein hydrolysate mixture in about 200 cc. of water be administered ten or fifteen times a day and at night if desired, thus permitting a protein intake of 200 to 300 Gm. in twenty-four hours and an adequate calory intake through the carbohydrate consumption to promote utilization. It has been our practice to employ mixtures of protolysate, essenamine, casec, amigen or parenamine mixed with dextrimaltose in the amount of 300 Gm. each. Where powdered protein and dextrimaltose are used, 3,000 cc of distilled water is employed as a diluent for twenty-four hour periods Vitamins and salt are added

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*Dextrimaltose, cane sugar, cerelose or corn syrup may be substituted. Koehler and Allen[23] have observed that lactose has a pronounced tendency to cause diarrhea and flatulence.

Ferracani recommends tube feeding concentrations of 100 Gm of powdered bovine plasma per 1,000 cc of water Tui and his co workers[21] point out that the too rapid administration of high amino acid mixtures will lead to hyperaminoacidemia, which usually produces much nausea and vomiting They recommend that initial doses be kept under 30 Gm of amino acid Later, amounts can be increased if desired Occasionally diarrhea ensues and may become a serious impediment to hyperalimentation Kaolin and powdered aluminum hydroxide medications are to be avoided as they interfere with amino acid absorption Apple sauce, apple powder, and pectin are considered of value Paregoric is often necessary When diarrhea cannot be controlled, the formula must be diluted further or changed entirely

The liquid diets discussed in the section on preoperative nutrition are suitable for tube feeding Stare and Thorn[2] caution the injecting of air into the stomach in administering tube feedings They recommend frequent feedings of small amounts, 50 to 100 cc at hourly intervals

Postoperative Nutrition—In considering the postoperative nutritional needs of the patient who has undergone a major intestinal operation it is well to be guided by the results of recent research supporting the contention that abnormal nitrogen losses occur after trauma The National Research Council[8] has published important data stressing the severity of these losses and the necessity of beginning high protein intake early They found optimal nutrition to be one of the most important aspects in the general treatment of convalescence and rehabilitation

Howard has submitted studies[29] based upon observations of patients experiencing severe injuries The average nitrogen loss in a group of patients was 225 Gm, or in terms of protein, 1,400 Gm, which represented about 15 pounds of muscle protoplasm The maximum loss was noted six and six tenths days after injury A total of thirty five days' negative nitrogen balance was the average Operative cases showed a somewhat shorter period of negative nitrogen balance (nine days) Howard found that the loss occurred primarily in the urine and attributed it to increased protein catabolism Patients suffering from chronic diseases showed less disturbance of nitrogen equilibrium than did strong healthy persons, who sustained marked losses following severe injury

Ariel observed a greater fall in plasma protein in patients with cancer of the gastrointestinal tract than in patients with other diseases Our experience is in agreement Not uncommonly have we noted severe nitrogen postoperative losses losses which are too commonly obscured by fluid imbalance and which do not manifest themselves until three or four days after the operation At that time inanition delayed wound healing and complications are common

When these facts are recognized it becomes imperative that early measures be taken to restore nitrogen equilibrium Of greatest value has been the development of parenteral nutrition This method is employed throughout the early postoperative period until the patient can tolerate adequate oral feedings At the time similar high protein administration, as described under preoperative nutrition, is initiated

Parenteral Nutrition—The subject of parenteral nutrition is far too extensive to cover in this report, but it is hoped that a few recent practical applications of parenteral alimentation may prove of some value to the clinician

The question invariably arises whether intravenous feeding in itself can support positive nitrogen balance Until recently the answer to this question was in the negative At present a number of developments have changed the picture and in many patients it is quite possible to maintain positive nitrogen balance without oral or gastrointestinal administration We are on the verge of an era in which parenteral feeding may attain an equal status with oral feeding or may even surpass it

Human albumin has distinguished itself as being potent enough to secure positive nitrogen balance quickly A disadvantage lies in recent evidence that plasma proteins and especially plasma albumin may not be adequate as [illegible] source of [illegible] protein.[31] In experiments with rat growth the proteins of human plasma have been found deficient in isoleucine[32] and those of human albumin in isoleucine and tryptophane.[33]

Protein for some years has been furnished parenterally through the use of whole blood, plasma, albumin or casein hydrolysates. Whole blood is widely used and undoubtedly possesses much nutritive value. An important factor in this respect is the role whole blood plays in sparing tissue proteins. Whipple[34] has demonstrated clearly that much protein is diverted to hemoglobin formation and that actually this transfer may occur at the expense of blood and tissue protein. Coller[35] therefore advises that hemoglobin levels be restored prior to intensive protein parenteral alimentation.

The administration of plasma has long been considered an effective method of correcting nitrogen deficiencies, and in their studies Allen and his co-workers[36] found it superior to amino acids for the establishing of positive nitrogen balance, despite the postulations of Elman,[37] who expressed the opinion that the exchange between blood protein and tissue protein occurs through the medium of amino acids and not through that of plasma protein.

Human albumin is superior to whole blood plasma[38] for rapid restoration of protein losses. It is, however, almost prohibitively expensive, and the amount available is limited.

Amino acids derived through casein hydrolysis are of much value. An outstanding drawback has been the necessity of finding a way to furnish enough calories at the time the amino acids are administered, thereby preventing these substances from being burned by the body to replace needed caloric intakes. Intravenous dextrose has not been sufficient. Recently, alcohol has been employed with much success[39] as a food from which a comparatively large quantity of calories can be obtained. It is administered intravenously in 5 to 6 per cent alcohol solutions. About 7 calories are obtained from 1 Gm. of alcohol.[40]

Other methods of furnishing calories are rapidly being developed. Foremost of these methods has been the research in the field of fat emulsions for parenteral use.[41] At present 6 per cent,[42] 15 per cent[41c] and 30 per cent[41d] solutions have been attempted. We know of no commercial preparation as yet available, and it seems apparent that a good deal more work is necessary before these substances will be in general use.

Gelatin has been advocated by Riegel, Keep and their co-workers.[12] Their results have been noteworthy in that their patients received 30 calories per Kg. per day and 0.3 Gm. of nitrogen per Kg. per day. Macromolecular gelatin as a part of the nitrogen ration makes possible the use of a solution somewhat less hypertonic than is otherwise necessary.

Kremen[43] has shown that nitrogen balance can be maintained by parenteral nutrition when as much as 3,000 cc. of a 5 per cent amino acid and 5 per cent dextrose solution is given, supplemented by 500 cc. of whole blood daily.

Bovine protein hydrolysates have not been administered quite as generally as have hydrolysates and amino acid solutions derived from casein. However. Weinstein[45] has presented some convincing work in which he indicates that bovine protein hydrolysates may be given safely by intramuscular and subcutaneous routes, in addition to the usual intravenous method. He found reactions to be at a minimum even though the rapid administration of a 5 per cent solution was the routine manner of procedure.

Our experience with the intravenous use of protein digests in patients recovering from a major bowel resection is comparable to that of Davis.[44] Our patients rapidly gain strength on this regimen; wound healing is more rapid, early ambulation is more easily effected and the incidence of complications is less. It has been our practice to administer 3,000 cc. of amigen or parenamine during the day following operation. Sufficient dextrose and alcohol are added to provide adequate calories; these amounts vary between 100 to 200 Gm. of dextrose and between 120 cc. to 180 cc. of absolute alcohol administered as a 6 per cent solution. Added to this are parenteral vitamins of the "B" complex and ascorbic acid (1,000 mg. every twenty-four hours).

Operative Results.—In a series of 1,014 cases of carcinoma of the colon and rectum, 790 resections were performed. There were 40 postoperative deaths, or a mortality rate of 5 per cent. When this is compared with rates of ten years ago a rather remarkable improvement is observed. Much of this advance has been due to the newer antibiotics, but it is our opinion that the improvement of preoperative and postoperative nutritional standards has also contributed materially, perhaps making a contribution even greater than the benefits of drug therapy

SUMMARY

1 In recent years the treatment of nutritional deficiency in the preoperative and postoperative periods has developed to a high plane of efficiency Less progress has been apparent in the perfecting of laboratory procedures for a quantitative assay of the extent of nutritional deficiency in body tissue

2 Protein loss is the most important factor in malnutrition Among the causes of such loss are

- *A* Improper diet and inadequate vitamin intake
- *B* Poor absorption
- *C* Loss of fluid and food as a result of vomiting or diarrhea
- *D* Hepatic dysfunction
- *E* Repeated hemorrhages
- *F*. Protein loss through exudation from ulcerating lesion
- *G* Increased catabolism of protein
- *H* Cancer, preventing normal protein production

3 A clinical evaluation of the state of nutrition in the cancer patient can be determined by a knowledge of the following values

- *A* Optimum weight of patient
- *B* Observed weight of patient
- *C* Plasma protein level
- *D* Plasma albumin level
- *E* Plasma volume
- *F* Nitrogen intake
- *G* Nitrogen output

4 The protein deficient patient is best treated intensively by oral or parenteral (or combination) alimentation as long as a positive nitrogen balance is obtained and maintained The deficiency has been corrected when equilibrium occurs or nitrogen output equals intake

5 Intensive nitrogen replacement usually means the twenty four hour administration of carbohydrate and protein to supply 3 000 to 3,500 calories Two hundred to 300 Gm of protein is administered

6 Protein catabolism is markedly apparent during the operative and postoperative periods This results in a serious postoperative fall in nitrogen blood and reserve supply

7 The parenteral administration of protein early in the postoperative period is invaluable in combating this loss, particularly when preoperative nitrogen intake has been adequate One hundred to 200 Gm of parenteral protein is administered in 3 liters of solution supplemented by absolute alcohol (100 to 180 cc) and 5 per cent dextrose per twenty-four hours This solution furnishes the necessary calories for correct utilization of the administered protein

8 In a series of 1 014 cases of cancer of the colon and rectum 790 resections were performed with a mortality rate of 5 per cent This low rate is due to a great extent to careful preoperative and postoperative nutritional management

RÉSUMÉ

1 Dans les annees récentes, le traitement de déficience nutritive pendant les périodes préoperatoire et postoperatoire, s'est développé jusqu'a un haut degre d'efficacité Moins de progres est apparent dans le perfectionnement des procédés de laboratoire pour determiner quantitativement le degre de déficience des tissus corporels

2 La perte de proteine est le facteur le plus important dans la malnutrition

Parmi les causes de cette perte, on peut enumerer

(a) Le manque d'une diete appropriée et d'ingestion des vitamines

(b) Pauvre absorption

(c) Perte de fluide et d'aliments résultant de vomissements et des diarrhées

(d) Dysfonction hépatique

(e) Hemorragies répétées

(f) Perte de proteine par l'éxaudation de lésion ulcéreuse

(g) Catabolisme exageré de proteïne

(h) Cancer empêchant l'élaboration normale des protéines

3 L'évaluation clinique de l'etat de nutrition chez le malade cancéreux peut être determinée par une connaissance de valeurs suivantes

alcohol absoluto (100 a 180 c.c.) y 5% de dextrosa por periodos de 24 horas. Esta solucion suministra las calorias necesarias para la utilizacion correcta de la proteina suministrada.

8. De una serie de 1.014 casos de cancer del colon y del recto, se realizaron 790 resecciones con un promedio de mortalidad de 5%. Esta proporcion baja se debe en gran parte al cuidado nutricio pre y portoperatorio.

ZUSAMMENFASSUNG

1. In den letzten Jahren hat sich die Behandlung von vor und nach Operationen auftretenden Mangelerkrankungen zu einem hohen Grade der Wirksamkeit entwickelt. Ein geringerer Fortschritt ist in der Vervollkommnung der Laboratoriumsmethoden zu sehen, die den Grad des Naehrstoffmangels im Koerpergewebe quantitativ erfassen.

2. Eiweissverlust ist der wichtigste Faktor in der Fehlernaehrung. Zu den Ursachen dieses Verlustes gehoeren:

a. Mangel an hinreichender Nahrungs- und Vitaminzufuhr.
b. Schlechte Absorption.
c. Fluessigkeits- und Nahrungsverlust als Folge von Erbrechen und Durchfall.
d. Leberfunktionsstoerung.
e. Wiederholte Blutungen.
f. Eiweissverlust durch Ausschwitzung aus Geschwueren.
g. Gesteigerter Eiweissabbau.
h. Verhinderung normalen Eiweissaufbaus durch Krebs.

3. Eine klinische Auswertung des Ernaehrungszustandes von Krebskranken kann durch die Bestimmung der folgenden Werte erfolgen:

a. Hoechstgewicht des Kranken.
b. Bestehendes Gewicht des Kranken.
c. Plasmaproteinspiegel.
d. Plasmaalbuminspiegel.
e. Plasmavolumen.
f. Stickstoffzufuhr.
g. Stickstoffausscheidung.

4. Der an Eiweissmangel leidende Kranke wird am besten intensiv mit oraler oder parenteraler (oder kombinierter) Ernaehrung behandelt, solange eine positive Stickstoffbilanz erzielt und aufrechterhalten werden kann. Der Mangel ist ausgeglichen, wenn ein Gleichgewicht entsteht oder die Stickstoffausscheidung der Aufnahme gleichkommt.

5. Unter intensivem Stickstoffersatz versteht man im allgemeinen die Verabfolgung einer Menge von Kohlehydraten und Eiweiss, die dreitausend bis dreitausendfuenfhundert Kalorien in vierundzwanzig Stunden liefert. Zweihundert bis dreihundert Gramm Eiweiss werden verabreicht.

6. Eiweissabbau wird waehrend und nach Operationen deutlich merkbar und fuehrt zu einem ernsten postoperativen Sturz des Blutstickstoffs und des Reservevorrats.

7. Die parenterale Verabfolgung von Eiweiss in den fruehen Stadien der postoperativen Periode ist in der Bekaempfung eines solchen Verlustes von unschaetzbarem Wert, besonders wenn die Stickstoffzufuhr vor der Operation unzureichend war. Hundert bis zweihundert Gramm parenteralen Eiweiss werden in drei Litern einer Loesung alle vierundzwanzig Stunden verabfolgt, ergaenzt durch absoluten Alkohol (100 bis 180 cc.) und 5% Dextrose. Diese Loesung liefert die fuer eine genaue Ausnuetzung des verabfolgten Eiweiss notwendigen Kalorien.

8. In einer Serie von 1014 Faellen von Dickdarm- und Mastdarmkrebsen wurden 790 Resektionen mit einer Sterblichkeit von 5% ausgefuehrt. Diese geringe Quote ist zum grossen Teil der sorgfaeltigen praeoperativen und postoperativen Handhabung der Ernaehrung zu verdanken.

RIASSUNTO

1. La cura delle deficienze nutritive nel periodo che precede o susseguе le operazioni ha fatto in questi ultimi tempi dei rapidi progressi. Progressi molto piu modesti sono stati invece realizzati nei metodi di laboratorio che consentono di tradurre in cifre il limite di queste deficienze.

2. La perdita di proteine e il fatto piu importante negli stati di denutrizione. Fra le cause piu comuni di questa perdita vanno annoverate:

A. Mancanza di una dieta adatta ed insufficiente introduzione di vitamine.
B. Scarso assorbimento.
C. Perdita di liquidi e di alimenti in seguito a vomito e diarrea.
D. Disfunzione epatica.

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Each man's mind is an unknown land to himself so that we need not be at such pains to frame a mechanism of adventure for getting to undiscovered countries We have not so far to go before we reach them They are like the Kingdom of Heaven within us —Samuel Butler

and tubes appeared normal Cystic cervicitis was detected by inspection The cysts were cauterized

The only important laboratory feature was a hemoglobin value of 70 per cent and a red blood cell count of 4,300,000 per cubic millimeter The anemia was treated with an oral iron and vitamin preparation

On Dec 20, 1948, the patient made her next appearance at the office She complained of chronic constipation Her anemia had improved the value for hemoglobin was now only 80 per cent The cervix was healed The patient's weight was unchanged

A hysterosalpingogram was done in the office on Jan 17, 1949 and appeared normal

On May 30 the patient complained of distention generalized abdominal pain and constipation An antispasmodic was administered, and several cysts of the cervix were cauterized

She finally consented to enter the hospital for roentgen study and diagnosis on August 20 but not for surgical treatment even if it should be indicated She was admitted to the Georgia Baptist Hospital with the complaint of constipation and an acute colicky abdominal pain She was distended and was passing some flatus She was given a soapsuds enema with fairly good results

Proctoscopic examination was unsatisfactory The instrument could be passed only about 10 [illegible] There seemed to be some extrinsic mass in the pelvis, even though no tumor or ulceration [illegible] noted

A roentgenogram of the colon was taken after barium enema The following report was given on August 23 by Dr Long, roentgenologist "Almost complete retrograde obstruction in the rectosigmoid, with associated irregularity suggesting ulceration proximal to it This is not particularly suggestive of malignancy, although it cannot be ruled out We would conclude an inflammatory process possibly secondary to diverticulitis as the most likely cause"

The red blood cell count was [illegible]260,000 per cubic millimeter, with 98 per cent hemoglobin the white blood cell count, 11,700 (segmental cells 69 per cent, lymphocytes, 25 per cent)

The patient was passing liquid feces when she was dismissed Aug 24, 1949 at her request to return in the near future for complete study and surgical treatment The diagnosis was rectosigmoid obstruction, almost complete She reported to my office August 27 for a proctoscopic examination which was again unsuccessful An extrinsic tumor was suspected The pelvic generative organs were normal The patient was given a liquid diet, protein, vitamins and cremosuccidine

She was readmitted to the Georgia Baptist Hospital on September 18

Present Illness—The patient, now 37 years of age came in for treatment of constipation, her chief complaint which had been more severe since May (1949) In May she had a severe attack that lasted one week during which time all the usual cathartics and enemas failed to bring about the desired results She had severe abdominal cramps (not menstrual) with gas pains across the middle part of the abdomen which at times were generalized These cramps were intermittent and sharp and [illegible] bent her double She stated that since that time she had had several mild attacks of constipation and abdominal pain The foods that [illegible] trouble were hard meats such as [illegible] pork chops In August she had another [illegible] attack of constipation accompanied by [illegible] colicky pains distention nausea [illegible] had to stay in bed for two weeks [illegible] diet at that time and [illegible] pounds (3 6 to [illegible] Kg) in weight [illegible] could not keep anything in her [illegible] and heartburn had been fre[illegible] the past year

History—[illegible] frequent attacks of tonsil[illegible] until eight years before admission [illegible] tonsillectomy was performed Su[illegible] [illegible]tomy had been done eight [illegible]

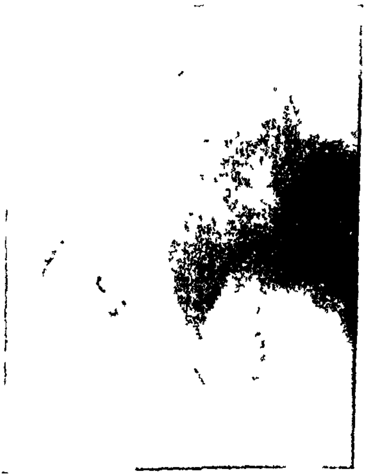

Fig 1 Normal hysterosalpingogram taken Jan 17, 1949

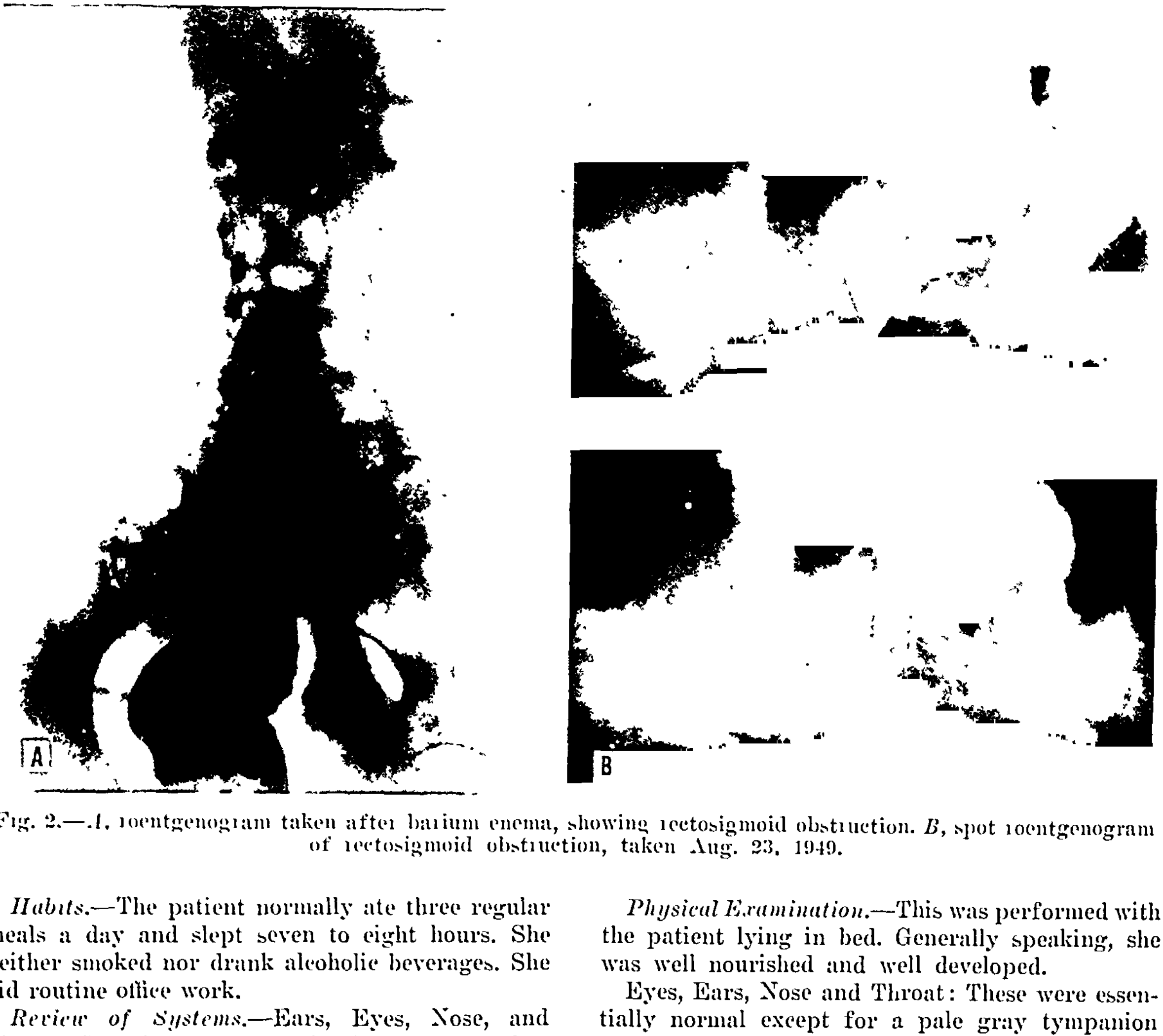

Fig. 2.—*A*, roentgenogram taken after barium enema, showing rectosigmoid obstruction. *B*, spot roentgenogram of rectosigmoid obstruction, taken Aug. 23, 1949.

Habits.—The patient normally ate three regular meals a day and slept seven to eight hours. She neither smoked nor drank alcoholic beverages. She did routine office work.

Review of Systems.—Ears, Eyes, Nose, and Throat: Popping sensations in the ears were frequent. During the previous winter there was severe earache, with rupture of the right eardrum and discharge of pus.

Gastrointestinal Tract: As noted under "Present Illness," constipation had been present for several years.

Genitourinary Tract: Dysmenorrhea had occurred only during the past six months, with backache and pains in the lower part of the abdomen. The menstrual periods were regular, occurring every twenty-eight days and lasting five. She had no leukorrhea and no dyspareunia. She had been married six years and had never been pregnant, in spite of the fact that no contraceptives were used.

Locomotion.—Aching in the calf of the right leg had been frequent during the past year.

Family History.—Both of the patient's parents had high blood pressure. There was no record of cancer, diabetes, tuberculosis or mental or hereditary disease.

Physical Examination.—This was performed with the patient lying in bed. Generally speaking, she was well nourished and well developed.

Eyes, Ears, Nose and Throat: These were essentially normal except for a pale gray tympanion at the right ear.

Neck: The neck was symmetric. The thyroid was normal in size. No thrills or bruits were detectable.

Thorax: The thorax was symmetric; expansion was equal and regular.

Heart: This organ was small on percussion, with regular rhythm. No murmurs were noted.

Blood Pressure: The blood pressure in millimeters of mercury was 124 systolic and 84 diastolic.

Pulse: The pulse rate was 80 (normal).

Respirations: The respiratory rate was 20 (normal).

Lungs: Both lungs were clear, anteriorly and posteriorly.

Abdomen: No tenderness, masses or fluid could be detected. Peristalsis was somewhat hyperactive. There was moderate distention of the entire abdomen. Percussion yielded a tympanic sound.

Back: No tenderness or deformity could be detected in the back.

Pelvis: The internal and external generative organs were within normal limits

Rectal Examination —Examination of the rectum revealed no abnormality

Proctoscopic Examination —Obstruction was present to the extent of 10 cm, but no tumor or ulceration was visualized through the proctoscope

Extremities —The extremities were symmetric and without abnormality There was no edema and no varicosity No growths were observable

Reflexes —The reflexes were normal

A laparotomy was performed on September 20 with fractional spinal anesthesia The uterus, tubes ovaries and supports appeared normal The entire colon was markedly distended to a point of the sigmoid near the rectosigmoid junction where a rather firm tumor was palpated It seemed to measure about 8 by 8 by 12 cm and to involve the entire circumference of the sigmoid It was not fixed, and no enlarged lymph glands were observed

Drs T C Davison and A H Letton were consulted at the time of the operation and opinion varied It was agreed that the obstruction would be fatal if not relieved It was decided not to take a biopsy specimen of the tumor A catheter cecostomy was performed The tumor "felt malignant" but the history was of a benign lesion of long standing

The postoperative course was uneventful The patient was dismissed on September 28 still restricted to a liquid and semisolid nonresidue diet Cremosuccidine was then taken four times a day

The patient was readmitted on October 23 The tumor of the sigmoid was removed and an end to end anastomosis performed Fractional spinal and sodium pentothal intravenous anesthesia was induced by Dr H S Philip Dr A L Letton assisted in this operation

The report of the pathologist Dr John Funke was as follows

The specimen is somewhat membranous measuring 8 by 8 by 12 cm Part of the external surface is corrugated grayish brown dull and granular Part is ragged glistening and reddish yellow, attached to which there is a good deal of fat The wall varies in consistence At one place there is a circular area 2 5 cm in diameter This area is rather firm cuts with resistance and the incised surface is lobulated with yellowish pink

Histologic Picture Throughout the muscle coat there are fairly large islands which have very [illegible] but which contain many small round and oat shaped cells and quite a number of tubules The tubules are relined with a simple layer of [illegible] epithelium the cytoplasm of which is fairly abundant with the nucleus placed at the base of the cell The cells are symmetrically arranged [illegible] and have not lost their polarity They are well differentiated and are not active At places [illegible] somewhat discrete tubules which are lined with [illegible] epithelium At other places [illegible], but among the oat shaped cells there are quite a number of fairly large spaces These spaces are lined with cuboidal epithelium

Diagnosis Endometriosis in the muscle coat of the sigmoid It is not malignant

Recovery was uneventful The patient was discharged from the hospital on November 5 She

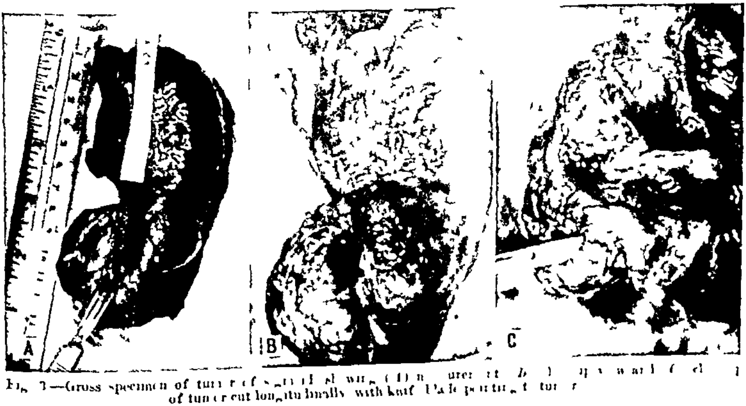

Fig 3—Gross specimen of tumor of sigmoid [illegible] of tumor cut longitudinally with knife blade pointing to tumor

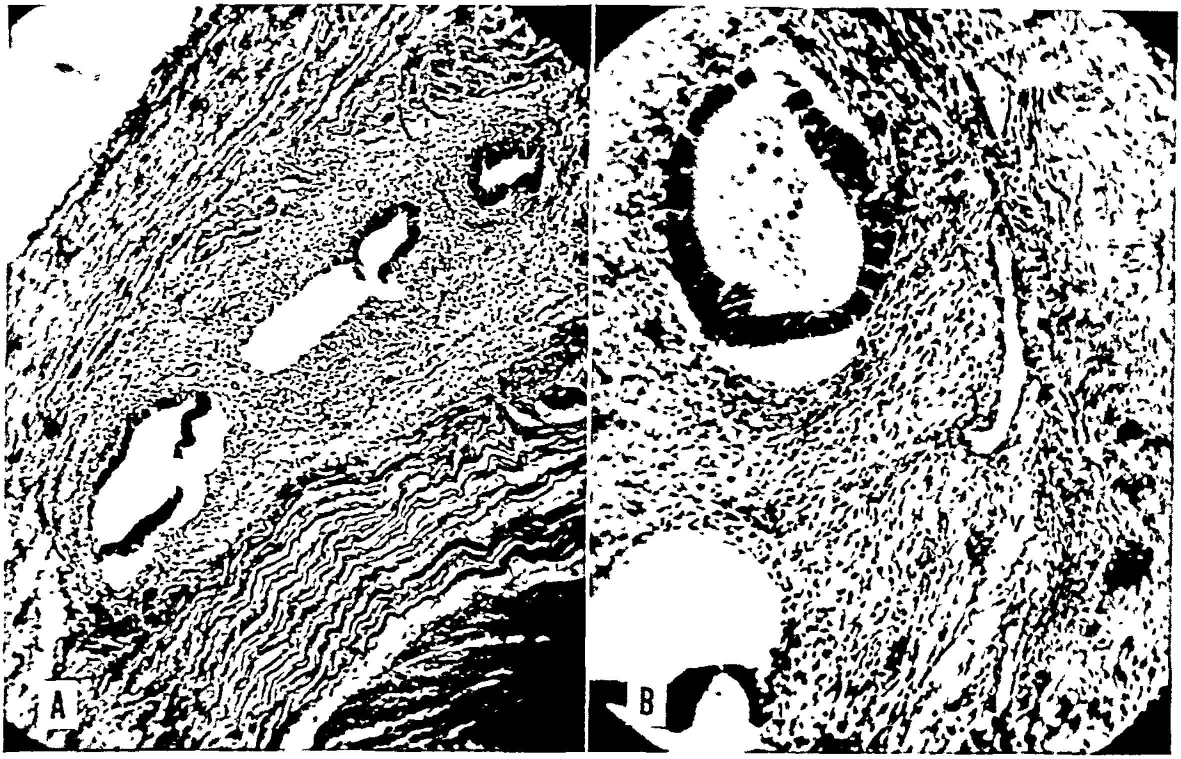

Fig. 4.—Photomicrograph showing endometriosis tissue in muscle coat of sigmoid: (*A*) low power field (× 10); (*B*) high power field (× 43).

reported that the cecostomy tube came out in ten days, that the opening was closed in twenty-one days without evidence of drainage and that bowel movements were normal.

She reported to the office on November 28, at which time she weighed 163 pounds (74.0 Kg.). The proctosigmoidoscope was passed with some difficulty to a depth of 18 cm. The former obstruction was gone, but there was some abnormal fixation of the bowel.

On April 28, 1950, roentgenograms were taken in the outpatient department at the Georgia Baptist Hospital, and the following report was given by Dr. L. Long:

"Barium Enema (progress study): The colon fills completely without difficulty, and the enema did not cause the patient any unusual discomfort. The colon is entirely normal in contour and capacity, *especially the sigmoid, where there is no evidence* of the previously demonstrated obstructing lesion and the point of anastomosis is not discernible."

Today the patient is cured and is free from symptoms.

Consideration of the differential diagnosis between carcinoma and endometriosis of the sigmoid should be discussed here. It is important both preoperatively and during abdominal exploration.

DIFFERENTIAL DIAGNOSIS

In the following outline of pertinent data, *C* indicates carcinoma; *E* indicates endometriosis (endometrioma), and *T* represents this case.

Age:
- *C* 40 to 60 years
- *E* 25 to 45 years
- *T* 36 years when obstruction was first discovered

Sex:
- *C* More often male
- *E* Female only
- *T* Female

Constipation:
- *C* Rapidly progressive—months
- *E* Slowly progressive and intermittent over a period of years
- *T* Slowly progressive and intermittent over a period of years

Dysmenorrhea:
- *C* Not due to pathologic condition in question
- *E* The rule: acquired and progressive
- *T* Acquired in past six months—not severe

Diarrhea

- *C* Alternating with constipation
- *E* Rarely
- *T* No diarrhea

Blood in Stools

- *C* Frequently
- *E* No Schofield and Bacon [illegible] that endometriosis rarely involves the mucosa
- *T* No

Pain, Generalized Abdominal

- *C* Late
- *E* With menstrual period
- *T* Intermittent attacks gene [illegible] abdomen, no history of p [illegible] menses as predominant

Pain, Rectal

- *C* None as a rule
- *E* During catamenia esp [illegible] presence of rectovaginal [illegible] plants”
- *T* No history of pain

Symptoms Increased at Menstruation

- *C* No
- *E* Yes
- *T* Not noticeably

Loss of Weight

- *C* Marked
- *E* Moderate if it occurs at all
- *T* None until obstructed and given a liquid diet preoperatively then only 8 pounds (3.6 Kg)

Sterility or Fertility

- *C* Usually have children
- *E* Usually childless or only one child
- *T* Barren

Dyspareunia

- *C* Not as a cause of sigmoidal growth
- *E* Frequently when rectovaginal septum is also involved or genital pathologic condition is present
- *T* No No involvement of reproductive organs

Sacral Pains

- *C* Not as a rule
- *E* Frequently
- *T* None

Anemia

- *C* Often marked
- *E* None
- *T* Mild, responded to oral ferrous preparation administered preoperatively

[illegible] roentgenogram taken on April [illegible] The film shows a [illegible]

Proctoscopic Observations

- *C* Ulceration of tumor, bleeding usually noted
- *E* Obstruction but rarely any ulceration with bleeding, constriction firm and unyielding
- *T* Obstruction without involvement of mucosa, constriction firm and unyielding

Roentgenographic Observations

- *C* Filling defect usually characteristic
- *E* Usually normal, not characteristic
- *T* Almost complete obstruction malignant tumor of rectosigmoid cannot be ruled out

Rectovaginal Septum

- *C* Usually normal in presence of sigmoid obstruction
- *E* Marked tenderness
- *T* No tenderness

Signs and Symptoms of Uterine and Adnexal Pathologic Change

- *C* Not associated with obstruction
- *E* Usually associated with some gynecologic disease process
- *T* None detected

Operative Data:
- *C* Irregular, nodular mass; firm, broad loose edges of ulcer are raised and rolled, indurated and fixed
- *E* Small nodules usually observed, slightly movable, with no involvement of underlying mucosa. No enlarged glands, but endometrial transplants elsewhere in pelvis, is the rule.
- *T* Described in pathologic report. No evidence of endometriosis elsewhere

Metastasis:
- *C* Yes
- *E* Yes, as a rule
- *T* No

Number of Growths:
- *C* One
- *E* One or more
- *T* One

Size of Growth:
- *C* Average 1 cm.
- *E* Few mm. to 1 cm.
- *T* Pathologist's measurement after removal, 8 by 8 by 12 cm.

From the foregoing differential data, this case presents evidence of some slow-growing benign lesion. There is little convincing evidence to suggest endometrioma, since many of the signs, symptoms and physical abnormalities usually given are lacking here owing to the absence of the usual widespread pelvic endometriosis. The coexistence of endometriosis and carcinoma of the sigmoid is difficult to diagnose except microscopically. Malignancy can develop in endometrial lesions in the lower part of the bowel, according to Thompson.[5] Henschen[6] has stated that endometriosis may, after a long benign course of malignant mutation, develop into adenocarcinoma with metastasis.

COMMENT

There is little disagreement as to the proper emergency treatment here. Decompression of the bowel proximal to the obstructive lesion is most often accomplished by performing a colostomy, but this patient was treated by catheter cecostomy. The fistula closed spontaneously in twenty-one days after resection and anastomosis.

Cattell and Colcock[7] stated that, unlike endometrial tissue elsewhere, it is not affected by bilateral oophrectomy. They reported a case in which the process was so extensive that a block dissection of the pelvic viscera had to be carried out, including abdominoperineal resection of the rectum and sigmoid. It is easy to understand that if inflammatory reaction fibrosis with contracture has occurred, castration possibly would not effect a cure.

McLean[8] stated that inflammatory reaction with fibrosis and adhesions is characteristic. He suggested that, when possible, elliptic excision with injury to the mucosa and closure of the defect is the treatment of choice. This was impossible in the case presented.

Mayo and Miller[9] wrote: "When the lesion looks like a malignant lesion, when metastasis cannot be found, and when evidence of the presence of endometriosis cannot be found in the pelvis, conservative resection of the bowel is the procedure of choice; especially if the patient is young and is desirous of having children."

Bacon[10] wrote: "Intestinal obstruction due to endometriosis demands surgical intervention. When the patient is a young woman wanting children and when the pelvic organs are essentially normal, resection of the involved segments of bowel is recommended."

Daniel[11] said that, in the presence of definite obstruction, resection with anastomosis is indicated.

Cattell[12] expressed the opinion that resection should be performed in patients with discrete endometriosis.

In this case I believe that resection was justified because of the presence of apparently normal generative organs in a patient in the reproductive years and anxious to bear children. Malignancy could not have been ruled out without total extirpation of the lesion.

SUMMARY AND CONCLUSIONS

1. A case of sigmoid obstruction due to endometrial tissue in the absence of generative organ or other ectopic endometrial tissue transplants, is presented.

2. The differential diagnosis of endome-

triosis and carcinoma of the sigmoid is outlined.

3. The coexistence of carcinoma and endometriosis must be considered a possibility

4. In cases of complete obstruction of the sigmoid, surgical intervention to deflate the distended bowel is of first importance

5. Diagnosis, especially in the absence of multiple endometrial "transplants," depends on the microscopic observations

6. Generally speaking, a single endometrioma of the lower bowel with obstruction should be resected. This is especially true of patients who desire children and who have no significant disturbance of the generative organs

RÉSUMÉ

1 L'auteur présente un cas d'obstruction de l'anse sigmoïde due au tissu endométrial. Il y avait absence de tissu endométrial dans les organes génitaux ou autre

2. Le diagnostic différentiel d'endométriose et du carcinome de l'anse sigmoïde est [illegible]

3. La coexistence du carcinome et de l'endométriose est une possibilité

4. En la présence d'obstruction complète du sigmoïde, l'intervention chirurgicale pour dégonfler l'intestin distendu est de première importance.

5. Le diagnostic dans l'absence de transplant endométrial dépend sur les résultats de l'examen microscopique

6 En général, un endométriome solitaire du gros intestin avec obstruction demande une résection. Cela est surtout vrai dans les cas relativement libres de pathologie des organes génitaux et dans lesquels les malades désirent avoir des enfants.

RESUMEN

1. Se presenta un caso de obstrucción del sigmoides debida a tejido endometrial en ausencia de órgano de la generación u otro tejido endometrial ectópico

2 Se cita el diagnóstico diferencial de la endometriosis y del cáncer del sigmoides.

3. Debe considerarse la probabilidad de la coexistencia de carcinoma

4. En casos de una obstrucción completa del sigmoides la intervención quirúrgica para contraer el intestino distendido es de primordial importancia

5 El diagnostico especialmente en ausencia de transplantaciones endometriales múltiples depende de las observaciones microscópicas

6 Generalizando debe hacerse un endometrioma en presencia de un endometrioma único del intestino bajo con obstrucción

Esto es especialmente cierto en las pacientes que desean tener hijos y que no presentan trastornos [illegible] en los organos de la generación

RIASSUNTO

1 D[illegible] di ostruzione del sigma [illegible] nonostante la mancanza [illegible] tessuti endometriali [illegible]

2 D[illegible] differenziale fra en[illegible] del sigma

[illegible] possibilità di coesistenza di [illegible] endometriosi

4 Nell'ostruzione completa del sigma l'operazione [illegible] eliminare anzitutto la distensione dell'intestino

5 Nell'assenza di trapianti endometriali multipli la diagnosi è affidata all'esame microscopico

6 Un endometrioma unico causa di ostruzione dell'intestino va asportato La resezione è tanto più giustificata nelle pazienti senza lesioni genitali desiderose di prole

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1 Es wird ein Fall von Sigmoidverschluss durch endometriales Gewebe dargestellt, in welchem weder irgendwelche anderen verschleppten endometrialen Gewebe noch die Zeugungsorgane vorhanden waren

2 Die Differentialdiagnose zwischen Endometriose und Krebs des Sigmoids wird besprochen

3 Es muss an die Moeglichkeit eines gleichzeitigen Bestehens von Krebs und Endometriose gedacht werden

4 In Faellen eines vollstaendigen Verschlusses des Sigmoids ist ein chirurgischer Eingriff zur Entlastung des gespannten Darmes von erstrangiger Bedeutung

5 Die Diagnose beruht auf den mikro-

skopischen Befunden, besonders wenn multiple endometriale Transplantate fehlen.

6. Allgemein gesprochen, sollte ein einzelnes obstruierendes Endometriom des unteren Darmes reseziert werden. Das trifft besonders zu auf Faelle, wo der Zeugungsapparat verhaeltnismaessig frei von Krankheitszustaenden ist und die Patientin gern Kinder haben moechte.

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Dr. Oliver Wendell Holmes. the dean of American physicians, as well as of American literature. was asked to suggest a name for the new discovery. Holmes wrote: "Everybody wants to have a hand in a great discovery. All I will do is to give you a hint or two, as to the names or the name to be applied to the state produced and the agent. The state should, I think. be called 'Anæsthesia.' This signifies insensibility. more particularly to objects of touch. The adjective will be 'Anæsthetic.' I would have a name pretty soon, and consult some accomplished scholar before fixing upon the term which will be repeated by the tongues of every civilized race of mankind."

Morton, however, preferred another name. He said: "I have found a name for the discovery and am going to call it 'Letheon.'" But Holmes's term was widely adopted and continues in universal use, while Morton's designation is known only to those who have studied the history of anæsthesia.—Ralph H. Major

Granulosa Cell Carcinoma of the Ovary

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THE particular purpose of this paper is to report a single case of death due to an uncommon but not rare type of ovarian tumor (600 reported cases[1]), concerning which there is considerable disagreement as to malignant status and also as to treatment.

The majority of recent textbooks briefly state that the tumor may occur at any age but that the recommended therapy is too conservative. In the past the lesion has been considered "clinically benign but potentially malignant" and this thought seems to be pretty well imbedded in the minds of the majority of clinicians and pathologists.[2] With the accumulation of case reports and a clearer conception of its symptoms, signs and histologic character the entity is more frequently recognized and its dangers are being evaluated. Text illustrations and accompanying discussions over emphasize the spectacular characteristics of the sexually precocious child or the postmenopausal woman. According to Dockerty's report in 1946,[1] only 5 to 10 per cent of these tumors occur before puberty, while 45 per cent occur in the active reproductive years. In this true greater age incidence, the diagnosis is more obscure and difficult and is too seldom considered. However, Bland and Goldstein,[3] in a critical review of 311 cases ten years earlier, found this tumor most frequent (about 60 per cent) after the menopause—and of their patients only 4 died of metastasis.

Histogenesis.—Robert Myer, cited by Fauvet,[4] first proposed the theory that these tumors arose from patches of imbedded granulosa cell rests in the ovarian cortex or medulla. However, Trout and Butterworth, cited by Curtis,[5] stated that cell rests are rarely seen in the ovaries of persons in the age groups in which these tumors occur and agreed with others (Robinson,[6] Dockerty and McCarthy) that they originate from the cells surrounding the follicle (undifferentiated mesenchyme of the ovary). Louw[8] expressed the opinion that, since the granulosa cell is so closely linked to the ovum, these tumors take their origin from the reaction of the ovarian stromal cells to certain "unknown particular chemical or physical stimuli," thus explaining the varying morphologic changes observed by the pathologist.

The cells of this tumor function like the normal follicular epithelium except that in an uncontrollable manner they secrete a substance that produces estrus when injected into mice and is present in high concentration in the patient's blood, urine and feces. Endowed with such potentialities, the tumor has a marked feminizing effect (contrary to the arrhenoblastoma, which has a masculinizing effect). The resultant symptoms are manifested not only in menstrual function but in secondary sex characteristics according to the age of the patient. During the active reproductive cycle, when the secondary sex characteristics are fully developed, only a high estrogen level is effective, with so-called "functional bleeding," although normal bleeding and even amenorrhea may result. Menstruation recurs normally when the tumor is removed. As happens with large doses of estrogens given therapeutically, vomiting and diarrhea with nausea and anorexia are frequently observed.[9] The breasts may become enlarged and tender.[10] Here the abdominal mass is more important as a diagnostic sign. The enlarging tumor may be the only presenting symptom, twisting on its pedicle, causing acute abdominal symptoms or obstructing the bowel because of metastasis.

Signs and Symptoms.—The excessive estrogen production varies with the age of the patient or the phase of his development.

In the prepubertal group the results are more spectacular and the diagnosis not so elusive. As the body contours approach the adult type, with accelerated skeletal growth and the appearance of pubic and axillary hair, uterine bleeding may occur in cycles, with an occasional enlargement of the uterus.[11] The mental age, according to Park,[12] is not affected. Removal of the tumor leads to regression of these characteristic manifestations.

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In the postmenopausal group bleeding may occur at regular or irregular intervals, the uterus often being larger than normal. Scrapings of the endometrium show hyperplasia, which, according to some authorities (Novak;[13] Dockerty;[7] Curtis[5]), even without evidence of a palpable tumor, is reason enough for exploratory laparotomy. The breasts are enlarged and often tender, and there is frequently an increased sexual desire. Removal of this tumor will produce a second, or recurring, set of vasomotor menopausal symptoms.[14]

Pathologic Picture.—Grossly these tumors vary considerably in size, from 1 or 2 cm. to a mass that may fill the abdomen;[14] they are ovoid or kidney-shaped, with a smooth, tough outer capsule, somewhat lobulated. The cut surface is characteristically grayish, with a yellowish tinge. They are generally solid, with small cystic cavities of varying sizes. Because different parts of the tumor vary in structure, there is confusion in the microscopic appearance. There are three main types: (*a*) follicular, the most common, in which the granulosa cells arrange themselves in clusters or rosettes around a central tumor; this is to be distinguished from the larger spaces suggesting the Call-Exner bodies, which are degeneration products in large masses of granulosa cells; (*b*) diffuse, in which the cells are arranged diffusely rather than in rosettes, and (*c*) cylindroid, in which the epithelial masses are split into cylinders or columns of various sizes by invading stroma cells. Hylanization and luteinization may occur in some tumors because of the transition from the more typical areas, and in this respect there is a striking resemblance to the sarcoma pattern. Uterine carcinoma with granulosa cell tumor of the ovary in older patients does occur and should be kept in mind.[2] In almost 70 per cent of the cases the uterus contains fibromyomas, and occasionally there is an associated carcinoma of the breast.[15]

Because of the rather tough capsule of the tumor, which rarely breaks, it has been considered relatively benign. Clinical metastasis of this rare ovarian tumor has been reported only sporadically and has, for the most part, been overlooked. It is deemed appropriate, therefore, to report this single case in detail. However, in a thorough review by Seegar and Jones at Johns Hopkins Hospital[16] it was found that of the 18 patients who were followed up, 15 were dead within three years. This is indeed contrary to the consensus of reviewed reports.[4] Novak[13] reported a case similar to the one here presented, of a 32-year-old patient in whom peritoneal recurrence took place three months after a radical operation was performed for a unilateral granulosa cell cancer. He also warned of an "overoptimistic viewpoint enjoyed by the medical profession" in referring to a follow-up of 32 cases, in 28.1 per cent of which the tumor proved to be malignant.

Treatment.—The treatment is surgical removal of the tumor, but a great responsibility lies upon the surgeon, particularly in view of the aforementioned conflicting reports and the dubious prognosis. As always, common sense and surgical judgment should rule in each individual case, in relation to the age of the patient. The most difficult decision is encountered with the active, sexually productive woman when it comes to the question of removing or sparing the remaining, apparently unaffected ovary. It must be kept in mind that even a tumor 1 or 2 cm. in diameter may be responsible for the conditions described. In such a case radical operation is the only procedure. However, that continued normal health and even pregnancy have occurred after removal of the tumor only is a matter of record.[17]

Postoperatively, testosterone, preferably given orally, and roentgen therapy, controlled by estrogen determinations of chemical values in the blood and urine, are valuable adjuncts to operation in some cases. According to Seegar and Jones,[16] the radiosensitivity of this type of tumor is hard to evaluate because of the normal variation of the degree of malignancy; however, Louw[8] cited 1 "inoperable case" in which, two years after irradiation, there was no evidence of recurrence. Most experience seems to indicate that high voltage roentgen therapy at best gives only temporary relief; for the tumor, if ablated, recurs and kills its host.[16]

REPORT OF CASE

Mrs. D. S., 34 years of age, was admitted to the Good Samaritan Hospital on April 7, 1949, complaining of a dull pain in the lower left quadrant of the abdomen and an intermittent bloody vaginal discharge, of approximately one month's duration. Her last normal period had occurred early in February. She believed that she was approximately two months pregnant.

The previous menstrual history was normal. She had had two children, now 5 and 10 years of age. Two years previously she had undergone treatment for a duodenal ulcer demonstrated by roentgen examination and subsequently had been relieved by medical treatment. During physical examination a "cystic ovary" about the size of a small egg was palpated on the right side. Operation was advised at this time, but the patient wished to postpone it. She was not seen again until just prior to her admission to the hospital.

Physical examination revealed essentially normal conditions except for tender breasts, tenderness in the left lower abdominal quadrant and some enlargement of the lower part of the abdomen. Vaginal examination revealed a slightly enlarged uterus with bilateral ovarian tumors, each about the size of a grapefruit, the right somewhat larger than the left, and of cystic consistency. There was an impression that the abdomen contained fluid but definite physical signs were lacking. The red blood cell count was 4,670,000 per cubic millimeter with 12.5 Gm. of hemoglobin, the white cell count was 6,350, with 75 per cent segmented neutrophils and 25 per cent lymphocytes. All other laboratory data were within normal limits. A clinical diagnosis of ovarian cancer, possibly a Krukenberg tumor was made, and on the following day bilateral salpingo-oophorectomy and subtotal hysterectomy were performed. Examination of the gastrointestinal tract revealed no evidence of gross pathologic change but two enlarged lymph nodes of the right gastric group were sectioned for biopsy. The proposed total hysterectomy was abandoned because of impending shock and sudden hemorrhage in the vicinity of the left ureter, which was involved in a thickened scar at the base of the bladder.

The pathologic report was as follows: Gross Description: One ovary mass measures 12 cm. in length and is composed largely of a thin walled multilocular cyst filled with clear watery fluid. At the base, however, there is a thickened disk shaped area about 6 cm. in diameter which is a solid yellowish grey tumor mass, slightly lobular in appearance. The solid tumor mass contains occasional small cysts filled with coagulated fluid. The fallopian tube is attached and shows nothing unusual, being rather atrophic in appearance.

The other ovary mass has a similar appearance except that it is grossly more lobular and measures 8 by 12 by 15 cm. Cross section shows a peripheral zone of solid firm yellowish grey tissue as seen in the other ovary, but the inner portions are rather soft, greenish grey gelatinous tissue. The fallopian tube is attached at the base and shows nothing unusual.

"The uterus, amputated low in the cervical neck, measures about 7.5 cm. in length and is 5 cm. in width at the fundus. The myometrium is quite firm and fibrous but contains no tumor masses. The endometrial cavity is small, regular in outline and lined with a thin layer of endometrium.

Microscopic Description: Sections of both ovary masses show essentially the same picture, consisting of rather typical but scanty ovarian stroma supporting varying sized acinar and tubular formations of definitely anaplastic cuboidal and polygonal epithelial type tumor cells showing moderate degrees of anaplasia. There is nothing in the pattern of proliferation and arrangement which would suggest dysgerminoma, Brenner cell tumor or arrhenoblastoma. While some of the cells are vacuolated there is no definite suggestion of Krukenberg tumor and there is a granulosa cell pattern present as evidenced by occasional acinar formation containing large ovoid cells. Sections of the uterine portions of the fallopian tubes show nothing unusual. Sections of the uterine wall show moderate increase in fibrous connective tissue in the myometrium and the endometrium is rather atrophic.

Diagnosis: Granulosa cell tumor of the ovaries (considered moderately malignant).

The immediate postoperative course was uneventful and the patient was discharged on the eighth postoperative day in fairly good condition.

The patient was given testosterone (10 mg. daily) and seemed during the next thirty days to make an excellent clinical improvement, but at about the middle of June she complained of mild nausea, biliousness and a heavy feeling in the lower part of the abdomen. There were definite signs of fluid in the abdomen and a hard almond sized mass was observed in the region of the right uterosacral ligament. She was referred to a roentgenologist and received one course of high voltage roentgen therapy, without appreciable benefit. Within the next few days there was a marked increase of fluid in the abdomen. She was rehospitalized on July 8 and 2,500 cc. of serosanguineous fluid was withdrawn. At that time a hard tumor about the size of a lemon was noted at the base of the former midline incision. Persistent vomiting, pain in the right lower abdominal quadrant and obstipation required a second laparotomy on July 18.

An acutely diseased and suppurative appendix imbedded in dense scar tissue was removed, the bowel having been freed of adhesive bands, the aforementioned mass was ascertained to be an indurated dense tumor in the omentum, which was

Diaphragmatic Hernia with Eventration and Herniation of the Spleen

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BROOKLYN

DIAPHRAGMATIC hernia is more frequently considered nowadays in the differential diagnosis of abdominal conditions, owing to the fact that surgical intervention is safer and far more successful than in former years. Many more operations have been performed for diaphragmatic hernia. Ladd and Gross, Truesdale, Donovan, Harrington and Sweet are prominent contributors to the literature dealing with the surgical treatment of diaphragmatic hernia.

The diaphragm is susceptible to herniation owing to the fact that embryologically there are several weak areas. The diaphragm is derived from the third and fourth cervical myotomes, and communication between the peritoneal and pleural cavities is closed at the end of the third month of intrauterine life. Weaknesses in the diaphragm usually occur in association with improper or imperfect fusion of various components of the diaphragm.

The commonest points are the foramen of Bochdalek, the esophageal hiatus and the pleuroperitoneal hiatus, situated dorsolaterally. The muscle bundles forming the leaves of the diaphragm are innervated by the phrenic nerve. The loose areolar tissue between the esophagus and the cardia and the muscular edge of the esophageal hiatus allow for free motion of the esophagus in the esophageal hiatus.

Mark has classified diaphragmatic hernia as follows:

1. Very short esophagus, with entire stomach above diaphragm
2. Diaphragmatic hernia with short esophagus, part of stomach above diaphragm
3. Hiatus hernia; esophagus of normal length, hernia consisting of stomach and possibly colon, which passes through the hiatus
4. Congenital hernia through the foramen of Bochdalek or the foramen of Morgagni
5. Congenital absence of diaphragm
6. Eventration of diaphragm
7. Traumatic hernia

Eventration of the Diaphragm.—This rare condition is caused by aplasia or atony of the diaphragmatic muscle fibers. It is more common in the male than in the female and occurs more frequently on the left than on the right, but occasionally it is bilateral. The diagnosis is made by roentgen examination. According to Dr. Willy Myer, no special treatment is indicated.

In the case here presented there was eventration of the diaphragm complicated by ectopy of the spleen, with obstruction of the cardiac end of the stomach. To our knowledge, no similar case has ever been reported.

REPORT OF CASE

Mrs. M. B., a white housewife aged 56, was admitted to the hospital on Dec. 11, 1947, with the complaints of anorexia, loss of weight and vomiting. She stated that she had "caught cold" three weeks ago and since then had lost her appetite and lost weight. For the past three days she had vomited almost constantly a green fluid, which at times was blood tinged. She had some pain in the chest and felt "as though food were sticking in her chest." She was chronically constipated and had had a tarry stool one day before.

The past history was essentially noncontributory, the only things of note being a cholecystectomy and appendectomy performed in 1946.

Physical examination was unremarkable except for the chest, which revealed dullness in the left lower area, with occasional crepitant rales. The heart was slightly enlarged to the left; a loud systolic murmur was heard over the entire precordium. Abdominally, there was some tenderness in the epigastrium. The edge of the liver was palpable 3 fingerbreadths below the costal margin. No other masses were palpable. A gastrointestinal series during hospitalization showed displacement of the upper end of the stomach and the lower end of the esophagus to the right by a mass extrinsic

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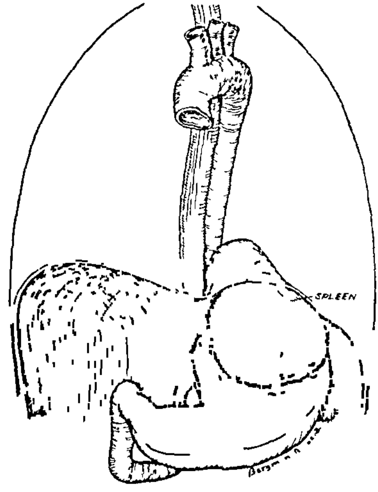

Artist's representation

to the gastrointestinal tract, which showed no abnormality. Gastric analysis revealed achlorhydria but no blood. The blood chemical values were normal.

Hospital Course.—From the day of admission the patient stopped vomiting and began to feel better. She signed a release on December 20.

Second Admission.—The patient was readmitted to the hospital on Jan. 20, 1948, with a history of almost continuous nausea and vomiting for the past two weeks, with constant pain in the epigastrium and the lower part of the chest, which was "sticking" but not yet colicky. She had lost 12 pounds (5.4 Kg.) in the past six weeks. Her bowels were regular and she had absolutely no desire for food. She was fed intravenously, nothing being given by mouth, but still complained of pain and vomited greenish material, which occasionally was blood streaked. The liver was 5 fingerbreadths below the costal margin. On January 23 operation was performed, with a preoperative diagnosis of hepatomegaly due to portal obstruction. The opening of the abdomen revealed that the liver was enlarged 5 fingerbreadths below the costal margin and presented a cirrhotic appearance. The stomach was grossly normal. There was a large hiatus hernia of the diaphragm, which was almost completely occupied by an adherent spleen. The spleen itself was lying around and on top of the cardioesophageal junction and obstructing the cardiac end of the stomach. The entire colon and small intestine were normal, as was the pelvis. The spleen was freed of all adhesions and removed from the hiatal [illegible] all splenic ligaments were severed, the splenic pedicle was exposed, the splenic artery and vein were individually clamped and ligated, the vasa brevia were clamped, tied and cut, absolute hemostasis was obtained and a splenectomy was performed.

A biopsy of the liver was performed. The pathologic report showed moderate chronic pericholangitis without evidence of hepatic cirrhosis. The spleen exhibited chronic perisplenitis and in addition there was diffuse moderate myeloid hyperplasia of the splenic pulp.

Postoperatively the patient did extremely well and was discharged on the seventeenth day with no complaints. After the operation she was seen at three month intervals. She has gained 35 pounds (15.9 Kg.) and at the time of writing is in perfect health. A repeat gastrointestinal series showed the previous distortion of the upper end of the stomach to be completely relieved. The liver has gradually shrunk until at the last examination, done on Jan. 10, 1950, it was palpable 2 fingerbreadths below the costal margin.

SUMMARY

The author reviews various types of diaphragmatic herniation. A case is presented of eventration of the diaphragm, with herniation of the spleen into the eventrated portion resulting in obstruction of the gastroesophageal junction. Relief was obtained by splenectomy.

RÉSUMÉ

L'auteur passe en revue différents types de hernies diaphragmatiques. Un cas est rapporté avec éventration du diaphragme et hernie de la rate dans la partie éventrée. Cette condition avait déterminé une obstruction de la jonction gastro-œsophagienne. Le malade fut soulagé par une splénectomie.

RESUMEN

En conclusión este caso debe ascribirse a prognatismo congénito con exuberancia del tracto horizontal de la mandíbula mientras que el tracto vertical y la mandíbula superior eran normales. Considerando su edad, el paciente estaba en la fase quirúrgica. El

rangement of tables, the numbering and legends of illustrations, etc. Only in this way can any journal present a consistent and well-edited appearance. If the author's style in these matters does not conform to that of the particular journal it is the business of the editors to make it conform before it goes to the printer. The editorial staff of the JOURNAL OF THE INTERNATIONAL COLLEGE OF SURGEONS takes its responsibilities very seriously, and no change is ever made that alters the original meaning. Changes are made only (*a*) to bring the material into conformity with the JOURNAL's style, (*b*) to correct actual misspellings or grammatical errors, (*c*) to eliminate repetition, (*d*) to supply what the author has left out (e.g., in the reference list or bibliography) and (*e*) to improve the sequence of subdivisions in the rare instances when this is necessary. Should an error creep in, as will happen occasionally since the best of editors are but human, the author himself is not more deeply distressed than is the unfortunate worker who is responsible for the mistake.

Special problems are posed by the foreign article which is not too well translated and requires hours of extra time to rewrite in intelligible English; by the article written in English but written carelessly; by the article which has the illustrations pasted directly on the text pages; by the article submitted with illustrations but without legends to explain them; by illustrations whose legends are written on their backs, and by the article already interlined with the author's corrections, which should have been typed again before submission. Examples of all these difficulties are frequent. In most instances the author never hears of them. The Editorial Staff corrects them cheerfully, patiently and as expeditiously as may be, but time is lost in spite of everything. A monthly deadline, like time and tide, waits for no man; unless the material for an issue reaches the printer in good condition before that deadline falls, it cannot appear in that particular issue.

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The paper, on its receipt, is checked in and sent to the Editorial Board for acceptance or rejection. Let us assume that it is promptly accepted. The Board returns it to the Editorial Office, and it is tentatively scheduled for early appearance by the Editor. It is then turned over to the copy editor for processing. The manuscript is edited and given to a typist for copying. Meanwhile the copy editor examines the illustrations, attaches the official sticker to the back of each giving the engraver the size and proportions desired, directions for art work if necessary to remove blemishes, extraneous material, etc., and sends them to the engraver for an estimate of the cost. The article has now been copied. The copy editor reads it again, carefully checking it with the original to make sure that no mistakes have been made in typing. An assistant then checks it over for the author's degrees, the date of submission and other pertinent data. The typist has copied the summary in quadruplicate (if there was no summary, the copy editor has written one) and a copy is sent to each of our four translators so that it may appear in French, Spanish, Italian and German as well as in English.

The engraver's estimate comes in. This is sent to every author with a return card indicating his approval. Only when the card has been returned can the engraver be given the order.

Very well; the card is returned, the engraver is told to go ahead and make the cuts, and the script is sent to the printer to be set in galleys. The galleys return; one set is sent to the author, one is carefully "read to copy" and filed, and the other is cut up to be used in the layout. Every page of the JOURNAL as the reader sees it has been meticulously pasted up on dummy sheets exactly as it will finally appear—text, legends, illustrations and all. The dummying up of a journal of this size is alone a major operation, requiring several days and a great deal of painstaking labor for completion.

Only when the dummy is complete and all corrected proofs have been received from the authors and approved by the Editor; only when all foreign summaries have been received, set in type and pasted up; only when all large blank spaces have been filled with [illegible] suitable short material and every page given [illegible] a final close scrutiny for [illegible] ready to go to press at [illegible] the Editorial Staff relinquishes it with [illegible] knowing that it is now to [illegible] about it should something [illegible] Will Dr. [illegible] A. be satisfied with the placing [illegible] bining, of his illustrations. Will Dr. [illegible] annoyed because he was not permitted [illegible] a patient a case? Will Drs. G. [illegible] pleased or displeased with the summary [illegible] plied? Whatever the outcome, it is all in the [illegible] laps of the gods, the inexorable presses are [illegible] even now rolling out the issue form by form. [illegible] manuscripts are clamoring [illegible] attention. The Editorial Staff uncrosses its [illegible] and gets back to work. [illegible] next week's mail, there will be [illegible] on the other hand, there [illegible] and unforgettable treasure [illegible] usually, be it said in all [illegible] of the authors whose [illegible] presented in the first place. [illegible] rule in author-editor [illegible] writers are those who most [illegible] efforts. They are good [illegible] the perpetual self-critics [illegible] perfection causes them no surprise.

M. T.

It is with the deepest sorrow that we record,

as we go to press, the death of

DESIDERIO ROMÁN, M.D., F.A.C.S., F.I.C.S.

Past President, International College of Surgeons

The Officers and Trustees of the College

express their profound sympathy and sincere condolences

to the bereaved.

New Horizons

By the Editor

Object Lesson*

In any sudden emergency a human life may depend upon the surgeon's ingenuity, resourcefulness and quick thinking. There is still need of all three even in the ultramodern hospital, with its wealth of highly specialized instruments, apparatus and trained assistance. What then shall be said of the demand upon the layman confronted with a desperate emergency that gives him no time to secure the surgeon's attention?

A few weeks ago, on a Montana farm, a man tried to eat his supper and found that he could not swallow. His throat was sore. He felt it with his hand. It was swelling. He thought little of it, remembering that he had been hit in the "Adam's apple" by a baseball that afternoon. He applied his own treatment—hot packs—and went to bed. About midnight he awoke again, strangling. He could not breathe. He was dying for want of air. The nearest doctor was twenty-five miles away.

In the farmhouse with him were a brother and the brother's wife, a young woman who had had three months' training as a nurse . . . just enough to teach her that her brother-in-law would die unless a way were found to let air into his lungs. The patient himself realized it and motioned her to act, making a cutting gesture across his throat.

The patient's brother took a jackknife from his pocket. He had been scraping paint with it the day before. Silently he handed it to his wife, who hesitated, nerved herself and plunged the knife into her brother-in-law's throat. The first thrust did not reach the windpipe; the second reached it but would not penetrate it; the knife was too dull. The husband brought a sharp paring knife from the kitchen and completed the incision. His wife meanwhile cut a small piece of rubber tubing from a household syringe. The incision was not large enough for its insertion. Another slash was made, and the tube went in.

All this without anesthetics, please note, and without even an operating table, the patient being held upright by force. With the others' aid he walked to the family car and was driven posthaste to the nearest hospital. The attending surgeon, having done what was necessary, looked at the amateurs respectfully. "A good job. . . . That incision is in exactly the right place . . . and only a quarter of an inch longer than I would have made it myself." Six days later the patient left the hospital and returned to his work on the farm.

Such a story calls for little comment. It is one more heartening evidence of the fact that the pioneer courage and resourcefulness that built America are still with us, and that intelligence and decision are sometimes more important than either training or equipment. Its chief significance to men of our profession is that of a reminder, of which too many of us stand in need. Let us never forget that the chief instrument is always the surgeon himself, and that no amount of costly equipment can substitute for strength, decision and courage.

**This incident was brought to our attention by Dr. Robert C. Davis of Great Falls, Montana, to whom grateful acknowledgment is made.*

The deep secrets of generation have been revealed, and the scheme of evolution has given us fairy tales more enchanting than the Arabian Nights' entertainment.

—Osler

General News Notes

Ambulatory Fracture Association Meeting Announcement is made of the eleventh annual meeting of the Ambulatory Fracture Association to be held at the Gibson Hotel in Cincinnati, Ohio from October 16 to 19 inclusive 1950. The association was founded for study of skeletal pinning and external fixation. The program will include the various skeletal fixation techniques, intramedullary pinning and hip nailing. Dr Curtis L. Hall is president of the organization. Information may be secured from the offices of the Association at 120 South La Salle Street, Chicago 3, Illinois.

Rehabilitation The Kessler Institute for Rehabilitation has recently completed a year of highly successful service. Dr Kessler writes

"Our institution is a nonprofit voluntary community service organization. All patients admitted to the Kessler Institute come to us through medical referral. All patients are provided with a physical examination and evaluation to determine their potentialities for rehabilitation. Our rehabilitation center does not provide for surgical, roentgenologic or laboratory work. Whenever these services are indicated, they are secured from a local hospital. Our program, therefore, concentrates on the training aspects of rehabilitation only. All patients who come to us, whether on an inpatient or an outpatient basis, receive a well rounded program of rehabilitation activities, including occupational and physical therapy, recreation, and training in the activities of daily living. This program is coordinated by one member of our therapy staff. . . . Patients do not come to us for a single treatment, but are scheduled for a complete program. Our service also includes vocational guidance and prevocational training activities in the occupational therapy department. This system of vocational exploration enables the vocational guidance staff to secure a realistic approach to the patient's physical abilities in relation to the demands of the job for which he is suited. . . .

"We also carry on an extensive education program. . . From time to time lectures and clinics are scheduled at the institute. We have an annual three-day amputee conference, and other courses on rehabilitation techniques are presented. These have included lecture series on amputations, neuro-anatomy, anatomy for physical therapists, etc. These courses are delivered, usually, by a medical or professional staff member. In addition, we occasionally conduct courses under the sponsorship of a local professional group, sometimes with visiting guest lecturers. These sessions are open not only to our own staff members but to other qualified professional personnel."

Public Health Association Meeting: The seventy-eighth Annual Meeting of the American Public Health Association and meetings of thirty-two related organizations in the field of public health and preventive medicine will be held in Kiel Auditorium, St Louis, October 30 to November 3.

More than 400 speakers and discussants will participate. The following sections are being developed: Dental Health, Engineering, Epidemiology, Food and Nutrition, Health Officers, Industrial Hygiene, Laboratory, Maternal and Child Health, Medical Care, Public Health Education, Public Health Nursing, School Health and Statistics.

The 1950 Lasker Awards for outstanding contributions to medical research and public health administration will be presented on Tuesday evening, October 31. The Sedgwick Memorial Medal, the Association's highest honor, given for distinguished service in public health, will be awarded at the Banquet Session on Thursday evening, November 2. Further information may be obtained from Dr. Reginald M. Atwater, Executive Secretary, American Public Health Association, 1790 Broadway, New York 19, N. Y.

Appointment: Thomas J. Kirwin, M.D., F.A.C.S., F.I.C.S., has been made Chairman of the Post-Graduate Urological Convention, conducted by the New York Society of the American Urological Association. The convention will be held at the Waldorf Astoria Hotel, November 6-10, 1950.

A.M.A. Convention: Dr. Robertson Ward, Fellow of the College at San Francisco, was the co-chairman with Dr. John Cline, President-Elect of the American Medical Association, for the A.M.A. meeting held in San Francisco, one of the most interesting conventions held in recent years. Dr. Ward was a delegate to the A.M.A. from California and was also Chairman of the Committee on Chronic Diseases. Dr. Suren H. Babington, Berkeley, writes: "Dr. Ward's enthusiasm and willingness to do everything within his power to make the meeting a success played an important part."

News from New Zealand: Ralph Scovel, M.D., F.I.C.S., of San Francisco, and his wife made a six-week flying trip to New Zealand early this year. While there, he read a paper before the New Zealand Medical Society on "Recent Advances in Surgery." He found New Zealand's surgeons very interested in the International College of Surgeons, and plans are being developed for the formation of a chapter there.

New Publication: A very instructive 90-page booklet on the Herrick Memorial Hospital at Berkeley is being edited by Dr. Suren H. Babington.

Certification: Lawrence E. Brown, M.D., F.I.C.S., Berkeley, California, was recently certified by the newly-organized American Board of Proctology.

Interamerican Congress of Surgery: The following have been chosen to form the Organization Committee for the Seventh Interamerican Congress of Surgery:

President: Dr. Oscar Guzman del Villar
Secretary: Dr. Jorge de Romaña
Voting Member: Dr. Felipe A de la Torre

The subjects to be covered in the papers for the Congress are *(1) Traumatism of the Urethra*, *(2) Rectosigmoid Cancer: Treatment*, and *(3) Results of Burns: Treatment*. The meeting will be held in Lima, November 19 to 25 inclusive, under the auspices of the Peruvian Government and in accordance with the regulations established by the Association of Interamerican Congresses of Surgery.

Further information may be obtained on request from Dr. Oscar Guzman del Villa, President, Camana 773, Lima, Peru.

Plastic Surgery Congress: A letter José Vélez Canseco, President, Esteban D. Rocca, Assistant Secretary, and Felipe L. Plaza, Secretary General, Latin American Society of Plastic Surgery, announces that the Fifth Congress of that organization will be held in Lima, Peru, November 5 to 10 inclusive, 1950. Members of the International College of Surgeons are cordially invited both to attend and to participate by presenting papers on plastic surgery or a related subject. The Congress will appreciate knowing the names of those who plan to attend and the titles of the papers they wish to present. In order that the program may be arranged punctually, this information is needed at the earliest possible date.

Phthisiologic Congress: The Second Argentina Congress on Phthisiology will convene in Cordoba, November 28-30, under the presidency of Professor Gumersindo Sayago. The program includes a discussion of the results of BCG vaccination, antibiotics in the treatment of tuberculosis and serosas tuberculosis.

German Surgical Society: Prof. Dr. E. K. Frey, Director of the Surgical Clinic of the University of München has been elected President of the German Surgical Society. The following were made Honorary Fellows: Prof. H. von Haberer, Prof. N. Guleke, Prof. R. Stich, Prof. A. Läwen and Prof. Oehlecker.

Bone Bank Established in Brooklyn: Dr. Paul Meyer, Jr., Executive Director, announces the establishment of a "bone bank" at the Jewish Hospital of Brooklyn. Deposits of bone will be obtained and kept under sterile conditions, to be made available to surgeons for bone grafting procedures. This will eliminate the necessity of taking bone from donors. It is expected that the stored bone, being immediately available, will shorten the time of operation and minimize shock.

Postgraduate Course in Thoracic Diseases: The Council on Postgraduate Medical Education and the Illinois State Chapter of the American College of Chest Physicians announce the Fifth Annual Postgraduate Course in Diseases of the Chest, to be held in the St. Clair Hotel, Chicago, Oct. 16-20 inclusive, 1950. Organization members and members of the staffs of medical schools and hospitals in Chicago will cooperate. Dr. Edwin R. Levine is chairman of the Course Committee and is assisted by Dr. Otto L. Bettag, Dr. William J. Bryan, Dr. Paul H. Holinger and Dr. Charles K. Petter. The Chairman of the Council on Postgraduate Medical Education is Dr. J. Winthrop Peabody. A varied and highly stimulating program has been arranged.

Everyone should keep a mental wastepaper basket, and the older he grows the more he will throw into it.

—Samuel Butler

Chapter News

United States Chapter

CLEVELAND ASSEMBLY

Dr Arnold Jackson, Secretary [illegible] the United States Chapter, announces that [illegible] for the Cleveland Assembly [illegible] November 3 inclusive, 1950 have b[illegible] [illegible]ted All indications point to the largest [illegible] history of the College

Hotel Reservations The [illegible] headquarters for the Assembly [illegible] reserved, and the Statler [illegible] filling rapidly Those who [illegible] hotel reservations are urged to write [illegible] the Cleveland Convention Bureau [illegible] Hotels at once

Banquet Dr Chester Trowbridge Chairman of the Banquet Committee report that reservations for the banquet are being filed rapidly and that all seats are expected to be taken by the [illegible] the Assembly open Dr Frank Lahey the [illegible] speaker at the Banquet will address the Assembly on "Some Recent Advances in Surgery

Scientific Program The scientific program [illegible] now complete unless some unexpected last minute changes are required Dr Charles B P[illegible] prominent Chicago surgeon will take the place on the program of the late Dr Roy [illegible] and will discuss surgery of the biliary tract Dr Max Thorek, in charge of guest speakers announces that Professor Benedicto Montenegro F A C S, F I C S (Hon), noted Brazilian surgeon (Sao Paulo) Professor Alfredo Monteiro F A C S F I C S [illegible] Rio de Janeiro Brazil and Professor Giuseppe Bendandi, F I C S Rome Italy will appear [illegible] our program

Convocation Dr Francis D W[illegible] Chairman of the Convocation [illegible] announces that all plans are complete and the [illegible] will be a colorful and brilliant [illegible] Dr Ernest F Purcell Newark New Jersey [illegible] be in charge of the pageant [illegible] D[illegible] Carr, Chicago is Chairman of the M[illegible] Program Over 600 candidates will be [illegible] Dr Curtis Lee Hall will pres[illegible] In a [illegible] the candidates for the [illegible] College, headed by Chairman Dr W[illegible] [illegible] Madison Wisc [illegible] members

Motion Picture Program The Chairman, [illegible] Philip Thorek, has prepared an outstanding [illegible]tion picture program It covers all phases of maj[illegible] surgery and includes many of America's leadi[illegible] surgeons The program appears elsewhere in th[illegible] issue

Honorary Fellows A number of eminent sur[illegible]geons will be inducted as Honorary Fellows

Television This will be an important innova[illegible]tion and will be presented by the Smith, Kline and French Laboratories of Philadelphia, who have [illegible]ponsored all previous television surgical programs Dr Thomas S Gerspacher, Cleveland, in charge of this program announces that surgical operations will be presented on Wednesday through Friday from 9 a m to 1 p m, originating at St Vincent's Charity Hospital Operations will be performed by leading Cleveland surgeons and excellent viewing facilities will be provided

Technical Exhibits Mr William J Burns announces that the technical exhibits will include 127 of the most recent [illegible] in the various [illegible] of surgery

The Davis and Geck Company will again present their popular motion picture program

Ladies Entertainment Mrs Harrison D H[illegible] [illegible] and her [illegible] that there will be [illegible] for the Ladies [illegible] the Cleveland Assembly [illegible] and tea, and a [illegible] Hotel [illegible] Grill [illegible] in [illegible]

Special Sections [illegible]

the eye, ear, nose and throat specialists will assemble for another stimulating program continuing through Thursday. These sections of the College are rapidly developing under the direction of such leaders as Dr. Chevalier L. Jackson.

The Orthopedic Section meets on Wednesday afternoon in Clubroom C under the direction of Dr. Henry Meyerding, incoming President of the United States Chapter. Several splendid papers will be presented at this session, among them one by Dr. George Garceau, Professor of Orthopedic Surgery, Indiana University Medical School, and recently elected Fellow of the College.

The Executive Council has authorized the establishment of a section on Obstetrics and Gynecology. Those interest in the formation of this section are requested to meet in the main assembly room immediately after the Wednesday afternoon program.

General Assembly Program: This program, commencing Tuesday morning, has been arranged to provide a comprehensive postgraduate review by leaders in two important fields—gastric surgery and thyroid surgery. The faculty of Western Reserve University Medical School will introduce the discussion by presenting the basic phases of each subject. These discussions will be limited to a fifteen-minute review of the anatomic, physiologic, pathologic and roentgenologic aspects. The Tuesday and Wednesday morning symposiums on Gastric and Thyroid Surgery will be followed in the afternoon by papers on general surgical subjects by other leaders in the profession.

At 8:00 p. m. on Tuesday and Wednesday all surgeons will assemble in the main hall to discuss gastric and thyroid surgery. The discussion speakers on the symposiums will appear on the platform and will answer questions through moderators. Questions will be collected during the morning sessions in order to give the essayists sufficient time to prepare their answers.

The Assembly program is such an extensive one that all members are requested to study it carefully in its final form, which will be mailed shortly before the meeting, and to budget their time accordingly. As only one copy of the final program will be sent, members are urged not to forget to bring them to Cleveland. Promptness in attending all sessions will be necessary, for the program must be run strictly on schedule.

* * *

Southern Surgical Section. An enthusiastic letter has been received from Dr. J. M. De los Reyes of Los Angeles, stating that the Southern California delegation is planning to arrange for special cars to attend the Cleveland meeting and that a large group is coming. He also reports that plans are under way for a Southern California meeting of the College on September 13, at Los Angeles, and that Dr. Robertson Ward, San Francisco, Regent of the Northern California group, will speak on "Carcinoma of the Thyroid."

Joint Meeting: On September 6 a joint meeting of the Wyoming and Colorado Sections of the United States Chapter of the International College of Surgeons and the Wyoming Chapter of the American Academy of General Practice was held at Cody, Wyoming. Dr. William Carpenter MacCarty of the Mayo Clinic spoke at the preliminary luncheon. Speakers on the scientific program were:

Dr. Kenneth C. Sawyer, Assistant Professor of Surgery, University of Colorado Medical School, Denver
Personal Experiences with Gastric Malignancies
Dr. R. Dean Woolsey, Assistant Professor of Neurosurgery, St. Louis University
Low Back Pain
Dr. Glenn W. Koford, Co-Chief of Surgical Staff, Memorial Hospital, Cheyenne
Persistent Occipitoposterior Labors

An honest misunderstanding is frequently the ground for future friendly intercourse.

—Henry David Thoreau

Final Program

Fifteenth Assembly of the INTERNATIONAL COLLEGE OF SURGEONS

United States Chapter

CLEVELAND PUBLIC AUDITORIUM, CLEVELAND OHIO

October 31-November 1-3 Inclusive, 1950

Tuesday, October 31, 1950

MORNING SESSION

Presiding. Lyon H. Appleby, M D , F R C S (Eng), F R C S. (Can.), F.A C S , F I C S , Vancouver, Canada

Secretary: Lloyd J Netto, M D , F I C S , West Palm Beach, Florida

Gastric Symposium

9.00- 9:15 **Patterson, John W., M.D.**
Assistant Professor of Anatomy, Western Reserve University School of Medicine
"Summary of the Surgical Anatomy of the Stomach"

9:15- 9:30 **Selkurt, Ewald, M.D.**
Associate Professor of Physiology, Western Reserve University School of Medicine
"Summary of the Physiology of the Stomach"

9:30- 9:45 **Reagan, James W., M.D.**
Assistant Pathologist, Western Reserve University School of Medicine
"Summary of the Surgical Pathologic Lesions of the Stomach"

9.45-10.00 **Friedell, Hymer L., M.D.**
Professor of Radiology, Western Reserve University School of Medicine
"A Survey of Upper Gastrointestinal Tract Lesions as Found by X-Ray Examinations, with Special Reference to Early Gastric Cancer"

10:00-10:45 **Intermission to View Exhibits**

10:45-11:00 **Sawyer, Kenneth C, M.D., F.A.C.S , F.I.C.S., Denver**
Assistant Professor, University of Colorado Medical School and Tumor Clinic, Consultant, General Surgery Fitzsimons General Hospital, Denver, Consultant, General Surgery, Veterans Hospital, Fort Logan
"Personal Evaluation of Vagotomy in Treatment of Peptic Ulcer"

11.00-11:15 **Nissen, Rudolph, M.D., F.I.C.S., New York**
Assistant Professor, Clinical Surgery, Long Island College of Medicine, Attending Surgeon, Brooklyn Jewish Hospital
"Atypical Gastroduodenal Resections for Peptic Ulcer"

11.15-11 30 **Wise, Robert A , M.D., F.A.C.S., Portland Oregon**
Assistant Clinical Professor of Surgery, University of Oregon Medical School Chief, Surgical Service Veterans Hospital Portland
"Gastric Polyps—Discrete and Diffuse"

11:30-11.45 **Connolly, Earl A., M.D., F.A.C.S., F I.C S , Omaha**
Associate Professor of Surgery, Creighton University School of Medicine Attending Surgeon, St Joseph's Doctors St Catherines and Childrens Hospitals
"Bleeding Peptic Ulcer"

11:45-12.00 **Meyer, Karl A., M.D., F.A.C.S , F.I.C.S., Chicago**
Professor of Surgery Northwestern University Medical School Chairman, Department of Surgery Cook County Hospital
and
Stein, Irving F., Jr., M.D., Chicago
Clinical Assistant in Surgery, Northwestern University Medical School, Research Associate, Hektoen Institute for Medical Research
"Recurrent Peptic Ulcer Following Surgery—Diagnostic and Therapeutic Problems"

12.00-12:15 **Babington, Suren H., M.D., F.I.C.S., Berkeley, California**
Chief of Surgery, Herrick Memorial Hospital, Berkeley
"Pre- and Postoperative Care in Gastric Surgery"

Tuesday, October 31, 1950

AFTERNOON SESSION

Presiding: Moses Behrend, M D , F A C S , F.I.C S , Philadelphia

Secretary: Ralph E. Scovell, M D , F.I C S , San Francisco

2.00- 2:20 **Baumgartner, Conrad J., M.D., F.A.C.S., F.I.C.S., Beverly Hills, California**
Associate Professor of Surgery, College of Medical Evangelists, Los Angeles Senior Surgeon, Los Angeles County General Hospital
"Lateral Cysts and Fistulas of the Neck"

2:20- 2:40 Sauer, Dean, M.D., F.A.C.S., St. Louis

Senior Instructor in Surgery, St. Louis University School of Medicine; Attending Surgeon, St. Louis City and St. Louis County Hospitals, St. Louis.

"Multiple Visceral Resections"

2:40- 3:00 Thorlakson, Paul H. T., M.D., M.R.C.S. (Eng.), F.R.C.S. (C), F.A.C.S., Winnipeg, Canada

Associate Professor of Surgery, University of Manitoba; Director and Chief of Surgery, Winnipeg Clinic.

"Multiple Primary Foci of Carcinoma of the Colon"

3:00- 3:20 Puestow, Charles B., M.D., F.A.C.S., Chicago

Chief, Surgical Service, Veterans Administration Hospital, Hines, Illinois; Senior Surgeon, Illinois Research and Educational Hospitals, Henrotin Hospital, Chicago.

"Causes of Postcholecystectomy Syndrome"

3:20- 3:40 Curtis, George M., M.D., F.A.C.S., F.I.C.S. (Hon.), Columbus, Ohio

Professor of Surgery, Ohio State University Medical School; Chief, Research Surgical Service, University Hospital.

"The Indications for Splenectomy"

3:40- 4:10 **Intermission to View Exhibits**

4:10- 4:30 Monteiro, Alfredo, M.D., F.A.C.S., F.I.C.S. (Hon.), Rio de Janeiro, Brazil

4:30- 4:50 Witte, Dexter H., M.D., F.A.C.S., F.I.C.S., Milwaukee

Former Associate Clinical Professor of Surgery, Marquette University Medical School.

"Carcinoma of the Cervical Stump"

EVENING SESSION

8:00- 9:00 **Panel Discussion with Morning Speakers**

Moderator: Claude J. Hunt, M.D., F.A.C.S., F.I.C.S., Kansas City, Missouri

9:00-10:00 **Panel Discussion with Afternoon Speakers**

Moderator: Herbert Acuff, M.D., F.A.C.S., F.I.C.S., Knoxville, Tennessee

Wednesday, November 1, 1950

MORNING SESSION

Presiding: Gordon S. Fahrni, M.D., F.R.C.S. (Can.), F.A.C.S., F.I.C.S. (Hon.), Winnipeg, Canada

Secretary: Lindon Seed, M.D., F.I.C.S., Chicago, Illinois

Thyroid Symposium

9:00- 9:15 Francis, Carl C., MD.

Assistant Professor of Anatomy, Western Reserve University School of Medicine.

"Summary of the Surgical Anatomy of the Thyroid Gland"

9:15- 9:30 Shipley, Reginald, M.D.

Associate Professor of Medicine, Western Reserve University School of Medicine.

"Summary of the Physiology of the Thyroid Gland"

9:30- 9:45 Graham, Allen, M.D., F.A.C.S., Pittsburgh

Associate Professor, Departments of Surgery and Pathology, Western Reserve University School of Medicine; Surgical Pathologist, Cleveland Clinic Foundation; Pathologist, Western Pennsylvania Hospital, Pittsburgh.

"Criteria of Thyroid Malignancy"

9:45-10:00 Davison, T. C., M.D., F.A.C.S., F.I.C.S. (Hon.), Atlanta

President, American Goiter Association; Chief, Surgical Service of Georgia Baptist Hospital; Surgical Consultant, Sheffield Cancer Clinic.

and

Letton, A. H., M.D., F.A.C.S., F.I.C.S., Atlanta

"Thyroiditis"

10:00-10:45 **Intermission to View Exhibits**

10:45-11:00 Bartels, Elmer C., M.D., F.A.C.P., Boston

Department of Internal Medicine, Lahey Clinic, Boston.

"The Proper Pre-operative Use of Anti-Thyroid Drugs"

11:00-11:15 Cattell, Richard B., M.D., F.A.C.S., Boston

Surgeon-in-Chief, New England Deaconess Hospital.

"Technic of Thyroidectomy"

11:15-11:30 Lundy, John S., M.D., F.I.C.S. (Hon.), Rochester, Minnesota

Chief, Section on Anesthesiology, Mayo Clinic; Professor of Anesthesiology, The Mayo Foundation for Medical Education and Research.

"The Problem of the Thyroid Gland from the Standpoint of the Anesthesiologist"

11:30-11:45 Crile, George, Jr., M.D., F.A.C.S., Cleveland

Surgeon, Cleveland Clinic.

"The Present Status of the Treatment of Hyperthyroidism"

11:45-12:00 Rawson, Rulon W., M.D., New York

Chief, Department of Clinical Investigation, Sloan-Kettering Institute; Associate Professor of Medicine, Cornell University Medical School; Attending Physician, Memorial Hospital, New York.

"Radioactive Iodine: Its Use in the Study and Treatment of Thyroid Neoplasms"

12:00-12:15 Bartlett, Robert, W., M.D., F.A.C.S., St. Louis

Assistant Professor of Clinical Surgery, Washington University School of Medicine.

"Pitfalls in the Management of Nodular Goiter"

AFTERNOON SESSION

Presiding: Philip Thorek, M.D., F.A.C.S., F.I.C.S., Chicago

2:00- 2:20 Wilkinson, R. J., M.D., F.A.C.S., F.I.C.S., Huntington, West Virginia

"Trichobezoar"

2:20- 2:40 McGraw, Arthur B., M.D., F.A.C.S., Detroit

Senior Associate Surgeon Henry Ford Hospital Detroit

"Surgical Aspects of Meckel's Diverticulum"

2 40 3 00 McGuire, Louis D, F A.C S, F I C.S, Omaha

Associate Professor of Surgery Creighton University School of Medicine Assistant Attending Surgeon Creighton Memorial and St Joseph's Hospitals

"Surgical Management of Acute Cholecystitis"

3 00- 3 20 Babcock, Wayne W, M D, LL D, F.A C S, F.I C.S, Philadelphia

Emeritus Professor of Surgery Temple University Medical School

"Possible Fallacies in Biliary Surgery

3 20- 3.40 Nelson, M. Russell, M D, F A C S F I C S, New York

Assistant Clinical Professor Gynecology and Obstetrics New York Medical School and Flower Fifth Avenue Hospital

'Obstetrical Bleeding'

3 40- 4.10 Intermission to View Exhibits

4 10 4 30 Moon, Louis E, M D, F A C S, F I C S Omaha

Associate Professor of Surgery and Head of Department of Proctology Creighton University School of Medicine

"A Discussion of Anal, Rectal and Sigmoid Lesions Commonly Seen

4.30- 4 50 Best, R. Russell, M D, F A C.S, Omaha

Professor of Surgery University of Nebraska College of Medicine Omaha

'Factors Related to Avoiding the Colostomy in Lesions of the Rectosigmoid

EVENING SESSION

8 00- 9 00 Panel Discussion with Morning Speakers

Moderator Arnold S Jackson, M D, F A C S, F I C S, Madison, Wisconsin

9 00 10 00 Panel Discussion with Afternoon Speakers

Moderator Harry E Bacon, M D, F A C S, F I C S, Philadelphia

Thursday November 2, 1950

MORNING SESSION

Presiding Rudolph Nissen, M D, F I C S, New York

Secretary Paul F Doege, M D, F A C S, F I C S, Marshfield, Wisconsin

9 00- 9.20 O Neill, J. Norman, M D, F.A C.S. Los Angeles

Instructor in Surgery University of Southern California Medical School, Attending Surgeon Los Angeles County General Hospital

"A Critical Analysis of Fifty Diaphragmatic Hiatus Hernias Repaired by the Abdominal or Transthoracic Approach

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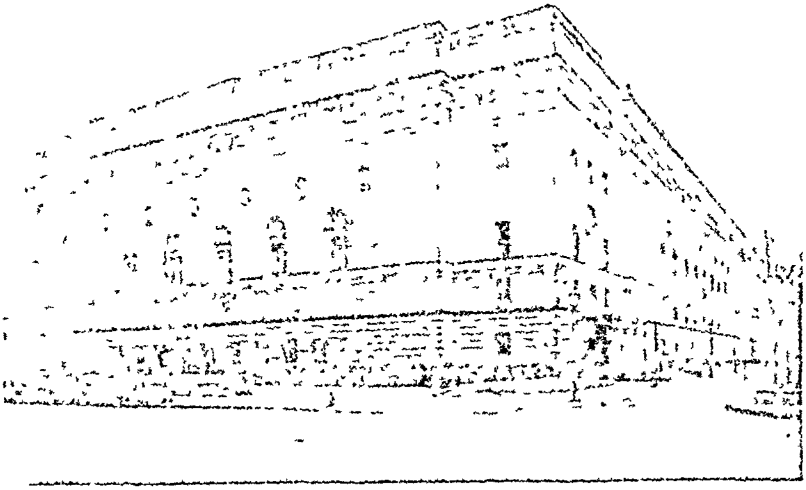

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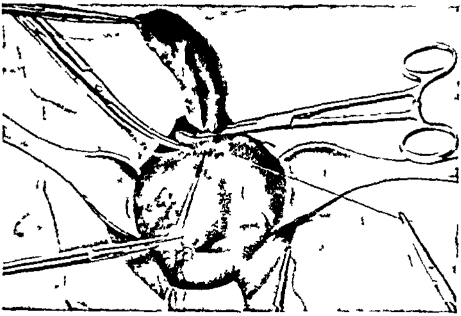

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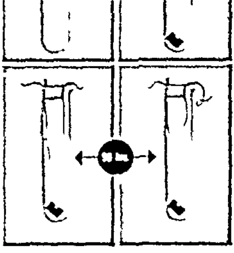

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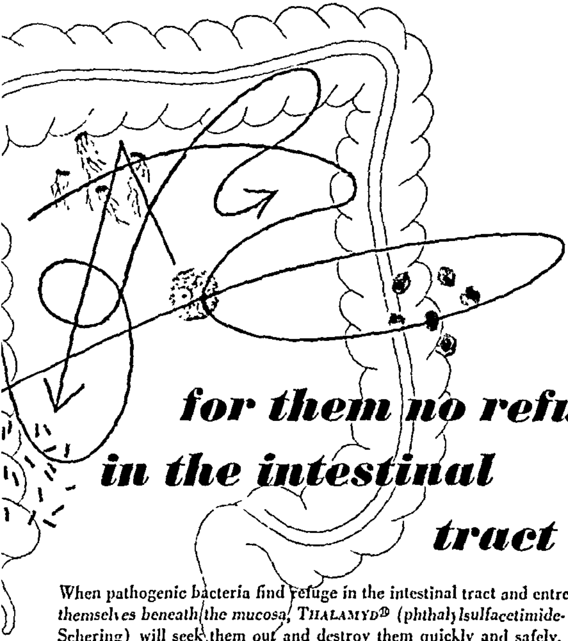

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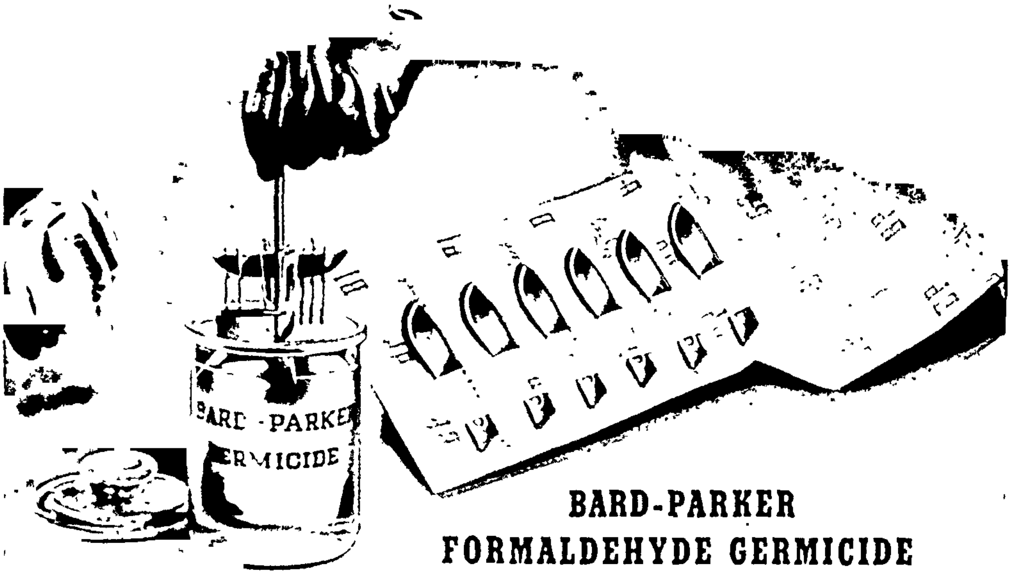

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The Journal of the International College of Surgeons

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Vol XIV AUGUST, 1950 No 2

Original Articles

Morbidity After Prostatectomy:
A Urethrocystographic Study

M LEOPOLD BRODNY, M D , F A C S , F I C S , AND
SAMUEL A. ROBINS, M D , F A C R
BOSTON

A STATISTICAL survey of the results of surgical treatment of benign prostatic hyperplasia was recently compiled from replies to questionnaires submitted to members of the American Urological Association[1] The analysis revealed that in 14,865 cases in which prostatectomy was performed there was prolonged morbidity in 1,242 A situation in which inadequate functional results are obtained in approximately 1 of every 12 cases (8 4 per cent) demands investigation and, if possible, rectification

The aim of prostatic surgical intervention is to restore a urethral channel that will function properly and permanently The presence or recurrence of symptoms after prostatectomy has irked every urologic surgeon, and perfect results are not possible in all cases The persistence of some symptoms is attributable to preexisting disease of the upper part of the urinary tract or to concomitant irreparable local pathologic change These factors account for a small proportion of failures, but in the majority of cases of prolonged morbidity the patient's symptoms are due to inadequate diagnosis and treatment.

Methods of investigating the local pathologic and anatomic changes that occur after prostatic operations have not been entirely satisfactory Cystoscopically it is difficult to obtain a graphic picture of the structure of the entire operative field, since endoscopic examination is limited by the lens to a transitory view of many small anatomic areas and the data are recorded by verbal descriptions, which vary in perspective and completeness Pathologically it is also difficult to study the various stages of gross repair in a given case, the shapes and structural relations of postoperative cavities, both in fixed material after prostatic enucleations on cadavers[2] and in patients subjected to autopsy after prostatectomy[3] are distorted by absence of the tonus of living tissue Roentgenographically the anatomic alterations following prostatectomy and the conversion of the prostatic cavity into a

---

From the Urological and Roentgenological Departments of the Beth Israel Hospital and the Tufts College Medical School

Read at the Fourteenth Annual Assembly of the United States Chapter International College of Surgeons Atlantic City November 1949

Submitted for publication Nov 15, 1949

posterior urethra can be accurately and progressively recorded.[4]

This treatise attempts primarily to focus attention on the use of roentgen examination in establishing the etiologic basis of unsatisfactory results after prostatectomy. The value of this procedure lies in its ease of performance, its freedom from complications and the fact that it provides important diagnostic information that often cannot be obtained by any other means. This method of examination presents a permanent graphic record for the appraisal of therapeutic results and the systematic study of existing conditions and future changes.

Our observations are based on more than 300 roentgenographic studies of patients who underwent every type of prostatic operation, including multiple procedures. The complications portrayed here are not all from personal cases, although we have had our share (8 per cent). Some of the patients were operated on at local and national urologic clinics, and the surgeons varied from enthusiastic resectionists to advocates of routine open prostatectomy.

The indications and contraindications, the opaque mediums employed and the urethrographic technic employing a specially designed urethrographic instrument have been previously reported.[5]

Anatomy of the Male Urethra.—The male urethra begins at the internal sphincter of the bladder, perforates the prostate in a slightly concave curve from the base to the apex, passes through the triangular ligament and continues along the ventral surface of the penis to the tip of the glans. The urethra is arbitrarily divided by the triangular ligament into an anterior cavernous portion and a posterior muscular portion.

Roentgenologic Anatomy.—The roentgenologic interpretation of the urethrogram re-

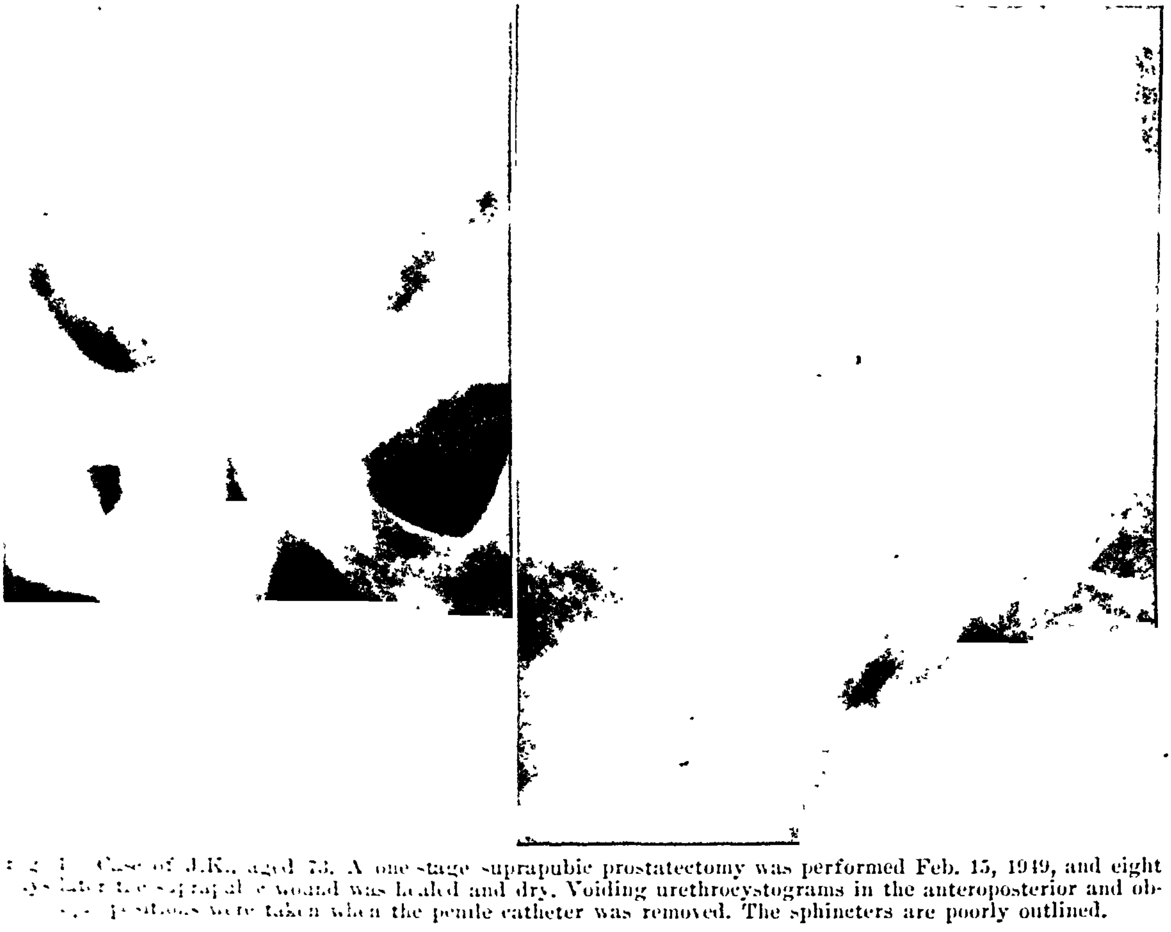

Fig. 1.—Case of J.K., aged 73. A one-stage suprapubic prostatectomy was performed Feb. 15, 1949, and eight days later the suprapubic wound was healed and dry. Voiding urethrocystograms in the anteroposterior and oblique positions were taken when the penile catheter was removed. The sphincters are poorly outlined.

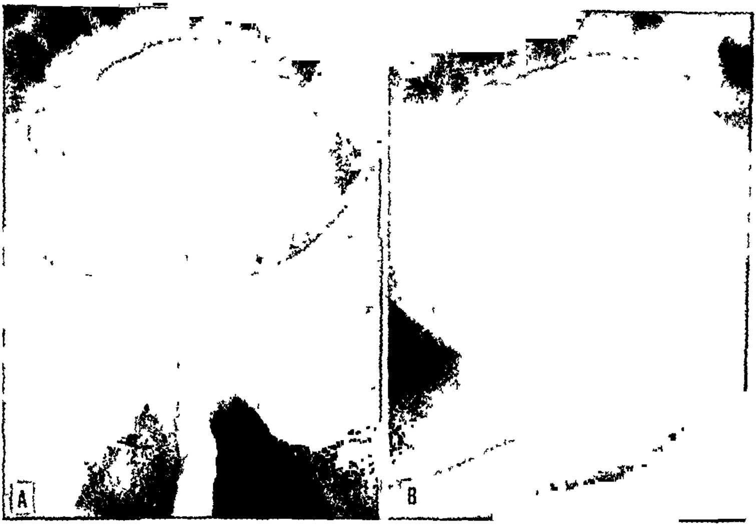

Fig. 2.—Case of M. R., aged 73, who had acute retention of two days' duration. *A*, preoperative urethrogram showing elongation of the prostatic urethra and subvesical intraurethral intrusion. *B*, urethrogram taken three weeks after a retropubic operation with resection of the internal sphincter. The base of the bladder is lower, the posterior urethra is shorter, the vesical neck is patent, and the tone of the external sphincter has returned. The patient voided easily. There was no residual urine.

quires a thorough knowledge of the appearance of the normal urethra. There are three normal areas of narrowing in the urethral canal: the internal sphincter, the external sphincter and the urethral meatus. There are also three normal areas of dilatation: the collicular portion of the prostatic urethra, the bulbous part of the anterior urethra and the fossa navicularis.

In the relaxed state the base of the bladder is slightly convex and lies at the level of the upper border of the pubic bones. The prostatic portion of the urethra is in the midline and is about 3 cm. in length. It is a *fusiform* structure beginning at the bladder and terminating at the external sphincter, which is characterized by a narrowing or constriction. In the widest portion of the prostatic urethra is an ovoid area of increased *radiance* produced by elevation of the verumontanum. The membranous portion of the urethra is wedge shaped, with the apex at the external sphincter and the distal portion terminating at the bulb. In the anteroposterior view the bulbous portion of the urethra is spherical and casts a denser shadow than does the rest of the urethra, owing to the penile scrotal curve, which causes overlapping. The anterior urethra is best visualized in its entirety in the oblique view. The outline is regular, and the canal narrows distal to the meatus.

The urethrographic features of prostatism, including a classification of prostatic obstruction, have been previously reported and described.[6]

Knowledge of the urethrographic appearance of the normal anatomic deformities after prostatic operations is necessary for under

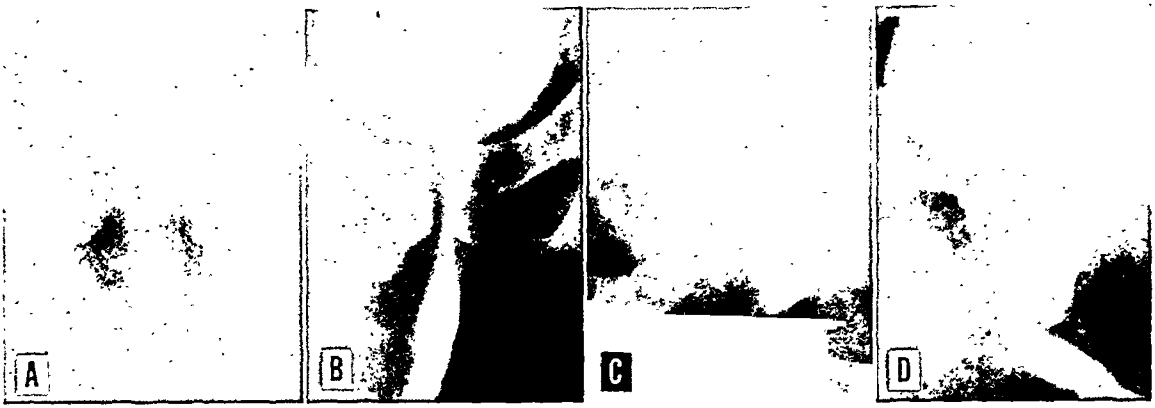

Fig. 3.—Case of H. S., aged 60, who was studied four months after a two-stage suprapubic prostatectomy. *A*, voiding urethrogram, anteroposterior view. *B*, voiding urethrogram, oblique view. *C*, retrograde urethrogram, anteroposterior view *D*, retrograde urethrogram, oblique view. Note the smooth outline of the posterior urethra and the clear demarcation of the external sphincter.

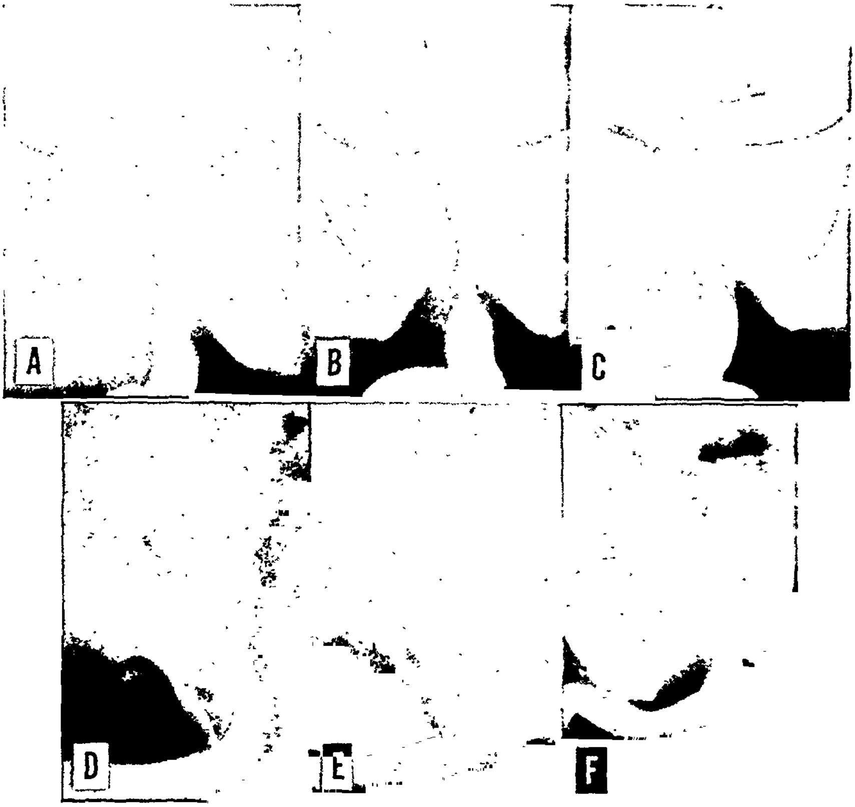

Fig. 4.—Case of W.F., aged 71. A two-stage suprapubic prostatectomy was performed in 1937, with good results. Note the continued contraction and shortening of the posterior urethra from 1938 to 1941. The shadow of the verumontanum, which was not seen preoperatively in 1937, can be clearly seen in the postoperative films.

standing of the pathologic picture. Involution of the bladder, the sphincters, and the urethra after prostatectomy may vary in minor details according to the type and size of the gland, the surgical approach and technic, and the reversibility of secondary anatomic changes, but, fundamentally, cavities of the prostatic bed follow a similar pattern of reconstruction and of end results after properly managed, uncomplicated surgical treatment.

The prostatic cavity immediately after removal of the catheter appears as an irregular funnel-shaped widening with the base at the bladder and the apex in the region of the verumontanum (Fig. 1). If the vesical neck has been resected or injured at operation (Fig. 1-b) or has been dilated by the prostatic growth, the bladder and prostatic cavities appear contiguous. Otherwise the two cavities are separated by a cylindric band, which varies in caliber and length and represents the canal through the so-called internal sphincter. The irregularity of the area may be due to edema, adherent mucus, superficial slough and tabs of devitalized tissue.

The urethra after removal of the catheter heals rapidly; the swelling subsides, and the necrotic tissue, together with other debris, is eliminated at voiding. At this stage the prostatic cavity is considerably diminished; the walls are less ragged, and the vesical neck lies at a slightly lower level (Fig. 2).

In two to four months the mucosa in the operative area regenerates[7] and gives a smooth appearance to the supracollicular portion of the urethra, which has further narrowed and shortened. The sphincteric impressions are now well delineated (Fig. 3).

At the end of a year the prostatic cavity is contracted in all directions and becomes spindle-shaped, with the dilatation in the middle third. At this stage the topographic character of the posterior urethra may resemble the normal, and it is sometimes difficult to recognize the fact that a prostatectomy has been done. The outline of the verumontanum can be seen in those patients in whom it has not been injured or has not atrophied (Fig. 4).

The involution of the bladder after prostatectomy is gradual and is usually complete. Removal of the obstruction causes the intravesical pressure to return to normal, and as a result the bladder wall thins out; saccules and trabeculations tend to disappear; the capacity of the bladder increases, and its contour become rounded and smooth. The concave filling defect at the base of the bladder observed on the preoperative cystograms of patients with large adenomatous glands becomes convex and descends to 1 or 2 cm. below the level of the upper border of the bodies of the pubic bones (Fig. 5).

The definition of normal function after prostatectomy presents a problem, since its evaluation varies with the patient's tolerance and the surgeon's attitude. Every patient is justly distressed by incontinence, and the surgeon invariably classifies this result as unsatisfactory. It is in such symptoms as frequency, nocturia and delay that discrepancy occurs. A patient reacts according to his pain threshold and his mental makeup; some exaggerate minor symptoms, others tolerate graver difficulties. Many urologists consider removal of the urethral obstruction satisfactory if there is improvement in function in one degree or

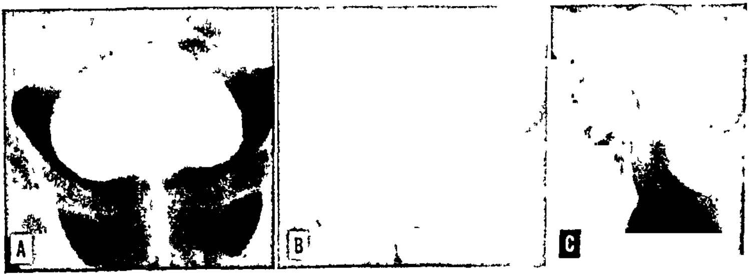

Fig. 5.—Case of H.G., aged 80. *A*, preoperative cystogram taken in 1935. *B*, postoperative cystogram taken in 1941. *C*, postoperative urethrogram taken in 1941.

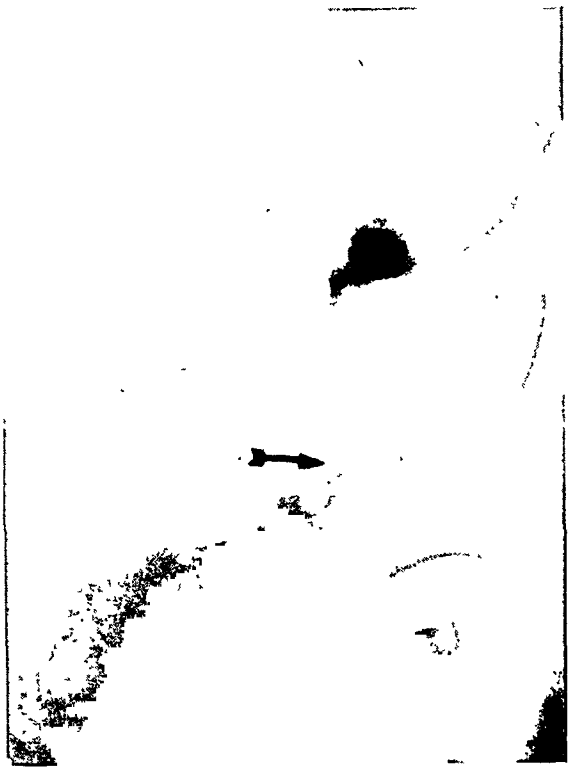

Fig. 6.—Case of M.Z., aged 73, who had a large intravesical prostate removed suprapubically in 1946. Convalescence was uneventful. Six months later there was difficulty in starting the urinary stream, with dribbling of urine after voiding. This urethrogram, taken on Dec. 21, 1948, shows almost complete obstruction of the canal in the membranous urethra. The base of the bladder is fixed and still elevated. The prostatic cavity is irregular, especially on the left. The urethra was dilated in the region under spinal anesthesia. A good result was obtained.

another, while others strive for complete relief of symptoms. These divergent viewpoints must be kept in mind when one is correlating functional results with the existing anatomic alterations.

Surgical complications such as incomplete enucleation (Figs. 14, 15 and 16). laceration or destruction of the sphincter (Figs. 18 and 19), extracapsular (Fig. 21) or subtrigonal trauma, excessive compression by packs and overdistended bags (Fig. 7) and deep and extensive cauterization (Fig. 13) most frequently result in abnormal structural deformities after prostatectomy. To facilitate this presentation we have arbitrarily grouped the sequelae into stricture obstruction of the vesical neck, residual prostatic tissue and urinary incontinence. Many important but less frequent complications have been omitted for lack of space.

1. *Strictures.*—Urethrographic study of this complication demonstrates the importance of postoperative dilation of the urethra in many cases. Urethral strictures have formed after every type of prostatectomy and are the most frequent urethrographic observation related to unsatisfactory functional results. Urethroscopic study in the presence of this conditions is extremely difficult and often fails if the strictures are multiple. Urethrocystographic examination with a minimum of trauma and discomfort provides accurate information as to the appearance, location and extent of the strictures. Localized destruction of the urethral mucosa with the resulting sclerosis causes loss of elasticity in

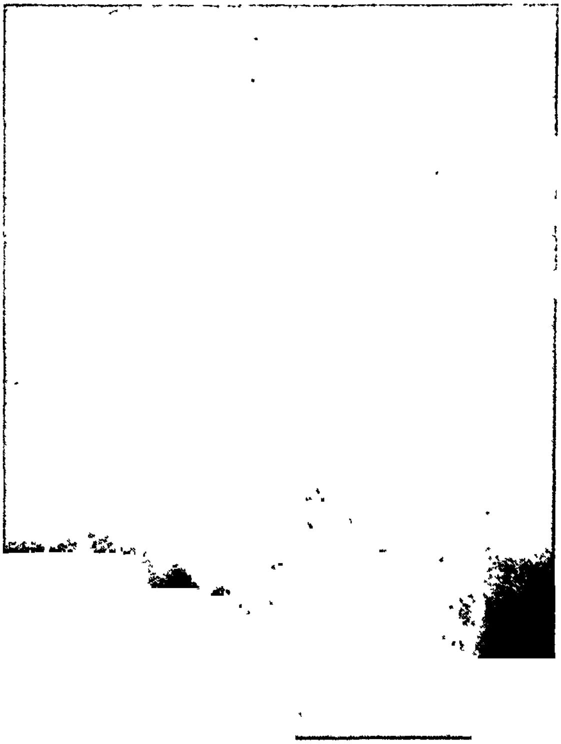

Fig. 7.—Case of J.D., aged 62. In 1937 a two-stage suprapubic prostatectomy was performed, followed by secondary hemorrhage. A hemostatic bag was inserted for twenty-four hours to control the bleeding. There was urinary incontinence after operation. The urethrogram, taken on July 18, 1939 shows rigidity of the posterior urethra and marked scarification at the external sphincter. There has been no improvement in spite of adequate and continuous urethral dilatation.

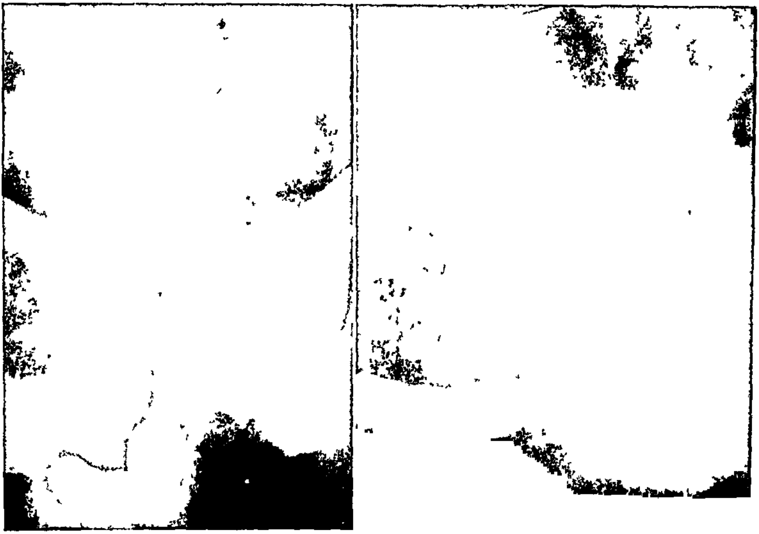

Fig 8.—Case of W C, aged 64. A simple perineal prostatectomy was done on Jan 16, 1948. Convalescence was uneventful. The urine remained infected in spite of chemotherapy and local treatment. Urgency and dribbling occurred unless the patient voided immediately. In this urethrogram taken on Sept 22, 1948 note the irregularity and notching of the outline of the membranous urethra. The stricture is due to external scar formation involving the sphincter and accounts for the poor control.

the involved areas of the urethral wall and appears on the urethrogram as pronounced narrowings which may encircle the urethral channel, or as notches, which may involve only part of the urethral circumference.

Strictures occurring after operation by the suprapubic method are most often observed in the posterior urethra at the junction of the prostatic and membranous portions (Fig 6) and are due either to injuries of the membranous urethra at operation or to too severe and prolonged compression by hemostatic bags or packs (Fig 7).

Strictures occurring after operation by the perineal approach often occur in the region of the external sphincter and are caused by periurethral scar formation constricting the urethra at the site of operation (Fig 8).

Strictures have their greatest incidence after transurethral operations (Figs 19 and 20) and especially after multiple resections. Constrictions form most readily in the penile scrotal angle and may be due to local injury, ischemia and infection secondary to the trauma of passing the resectoscope (Fig 9). In some patients a narrow inelastic posterior urethra develops indicating sclerosis throughout the prostatic channel (Fig 10).

Scarification of most or all of the posterior urethra has been observed. The severest excrescences occur after excessive fulguration and/or persistent infection or in patients in whom secondary hemorrhage has required prolonged hemostatic bagging and packing. On the voiding urethrograms the fibrosed posterior urethra does not dilate but remains rigid and narrow, and the base of the bladder is fixed and does not descend.

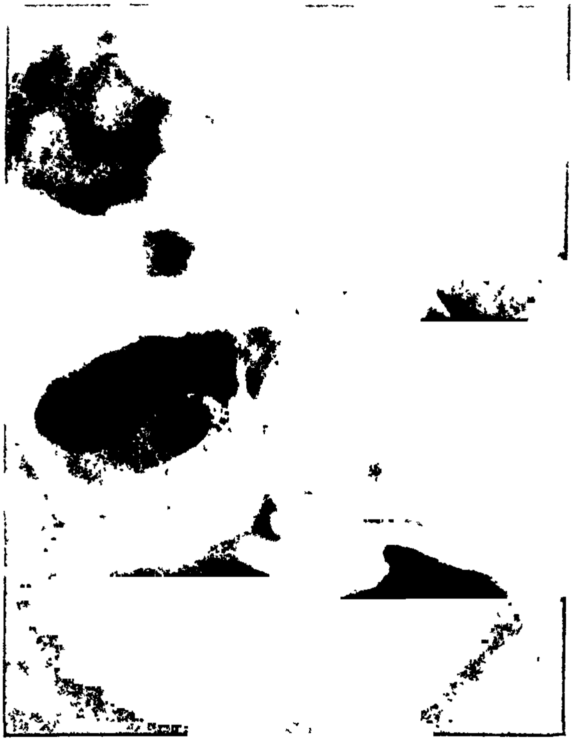

Fig. 9.—Urethral damage (periurethral abscess cavity) in the bulbous portion of the urethra one month after transurethral resection.

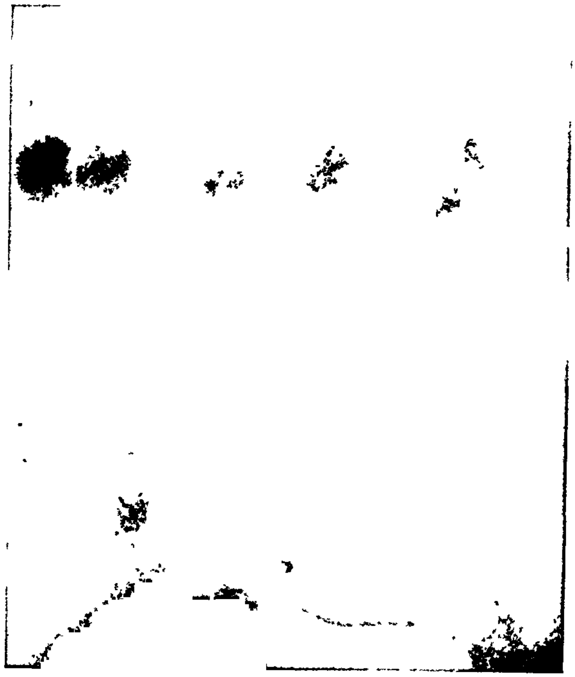

Fig. 10.—Urethrogram (oblique view) showing a tight, scarred posterior urethra one year after transurethral resection of 18 Gm. of prostate. The urethra was finally dilated with filiform but requires frequent stretching to keep the canal open.

2. *Obstruction of the Vesical Neck.*—The internal sphincter is an important factor in prostatism and may cause persistent symptoms unless properly managed.[8] Postoperative obstructions at the vesical neck may be divided into two groups:

(*a*) Those of omission: Failure to recognize and resect a spastic or hypertrophied or spastic internal sphincter will cause persistent symptoms regardless of the excellence of the prostatectomy. The intravesical type of prostatic growth often projects through and thins out the vesical neck. As a result, hyperplasia of the internal sphincter may not be recognized at the time of operation. Removal of the adenoma permits sphincteric contraction, which results in sufficient thickening to cause obstructing difficulties (Fig. 11). In the hypertrophied bladder the thickened wall at the vesical neck may fail to involute and cause obstruction regardless of the type of prostatectomy performed. The high incidence of obstruction of the vesical neck after retropubic prostatectomy prompted Millin to modify his

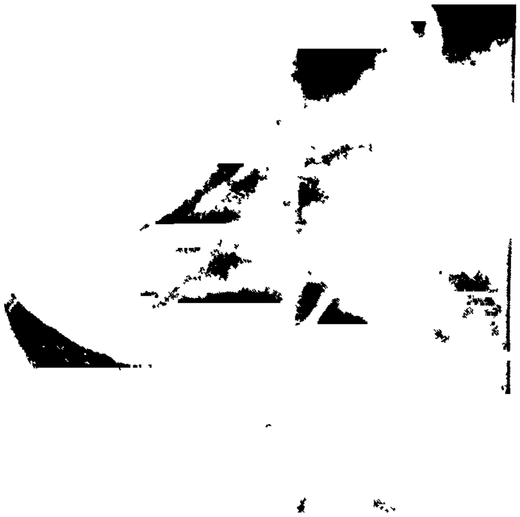

Fig. 11.—Urethrogram (oblique view) taken two years after suprapubic prostatectomy. The patient had persistent symptoms of prostatism. The collar constriction at the vesical neck is due to hypertrophy of the sphincter.

original technic to include wedge resection of the internal sphincter. Transurethral resection of median bars usually gives good results (Fig. 12), although failure to cut through all fibrotic or muscular tissues may lead to the eventual return of obstructive symptoms.

(*b*) Those of commission: Difficult or unskillful surgical treatment may result in poor restoration of the structures at the junction of the bladder and the urethra. The vesical neck may be directly injured by extracapsular enucleation, subtrigonal trauma, poor plastic operation, or too extensive resection of the internal sphincter. Indirectly, excessive scar formation (Fig. 13) may cause contractures and narrowing of the canal; this may be severe enough to obstruct the bladder almost completely.[9]

3. *Residual Prostatic Tissue.*—Every urologist has encountered cases in which obstruction persisted or recurred shortly after operation on the prostate and has been embarrassed when further investigation disclosed adenomatous masses that had been left behind. Urethrocystographic study will demonstrate the size, shape and position of the retained tissues and permit correlation with the clinical results.

Incomplete enucleation of the prostate (Fig. 14) is much more frequent than is generally realized. Routine postoperative urethrographic examination reveals many residual prostatic tabs, subtrigonal and suburethral glands, and even entire lobes that escaped the surgeon. Fortunately these retained tissues do not always cause dysfunction. A satisfactory result in spite of incomplete removal of the prostate is not a rare occurrence after resection. Symp-

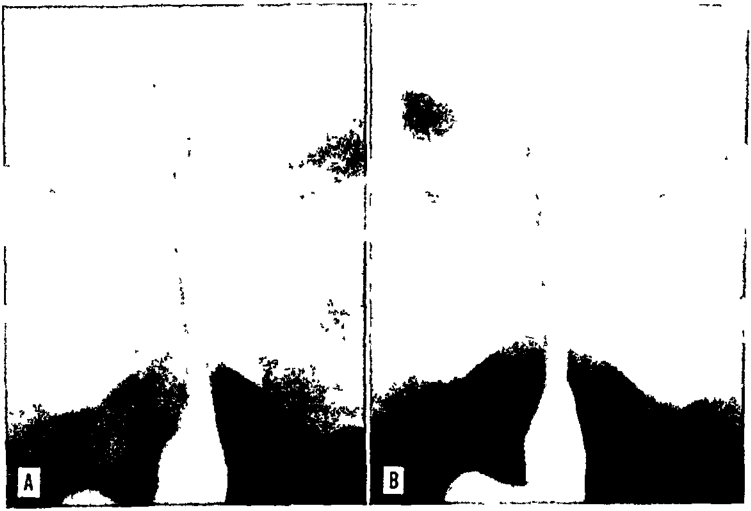

Fig. 12.—Case of S.G., aged 70. A suprapubic prostatectomy was done in 1932. In 1934 the patient complained of frequency and nocturia, and examination revealed 120 cc. of infected residual urine in the bladder. *A*, urethrogram taken June 19, 1934. The posterior urethra is wedged-shaped; the internal sphincter is elongated and narrowed. Transurethral prostatic resection was performed on July 15 of the same year. *B*, urethrogram taken Feb. 2, 1935. The constricting bar at the vesical neck has been removed and the posterior urethra widened. The patient last was seen in 1947 with voiding improved, the urine clear and no residual content in the bladder.

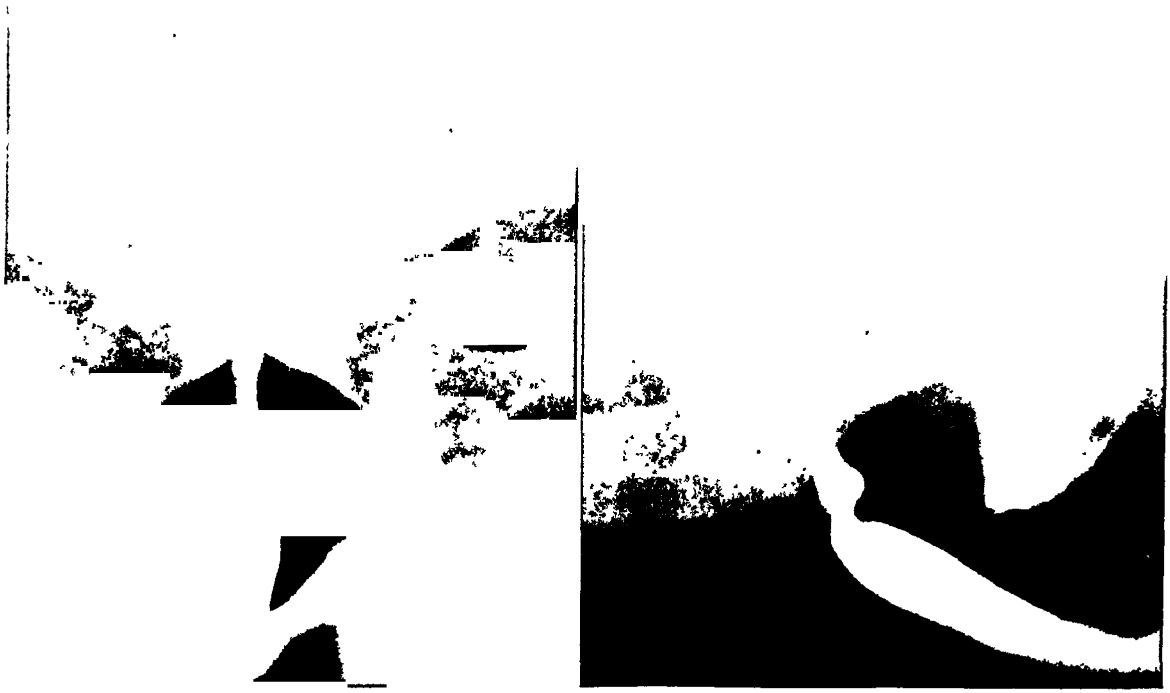

Fig. 13.—Case of G.K. A transurethral resection was done in 1945. Bleeding was controlled with difficulty by fulguration and Foley catheter pressure. Difficulty in urination persisted. In this urethrogram, taken on March 13, 1949, note the spasmodic stricture at the junction of the membranous and bulbous portions of the urethra and the marked irregularity of the prostatic cavity. On the oblique view, in the region of the vesical neck, a transverse shelf is seen. The urethra above this could be entered only by filiforms. Urethral dilatation and cystoscopic study revealed a mass of scar tissue at the vesical neck. Secondary resection was done, with improvement of the symptoms.

toms depend not so much on the size of the retained tissue as on their location and arrangement; residual prostatic tissue that projects into the vesical cavity, a partially enucleated nodule that intrudes into the vesical neck (Fig. 15), or a lateral lobe which encroaches on the posterior urethra (Fig. 16) will interfere with urination.

The incidence of retained prostatic tissue is higher for the two-stage prostatectomy as compared with the one-stage method, owing, no doubt, to the better visualization of the operative field in the latter procedure.

Retained lobes often require different types of operation for removal. Open enucleation may be done after one or more attempts at resection, and the transurethral approach may be employed after one of the open procedures (Fig. 12). In many cases considerable time elapses between the two operations, and early urethrographic examination probably would have prevented prolonged discomfort. In some patients obstructive symptoms may develop months or years after resection.[10] Urethrographic study reveals the regrowth of hypertrophied tissue in many of these cases (Fig. 17).

4. *Urinary Incontinence.*—Urinary incontinence occurs after every type of prostatectomy, with variable incidence. The paradoxic type is due to an overdistended bladder secondary to urethral constriction, prostatic obstruction or neuromuscular vesical dysfunction. The differential diagnosis in most instances can be satisfactorily made by roentgenographic study, and appropriate treatment instituted.

True urinary incontinence may be either

temporary or permanent. Temporary incontinence is due to infection, devitalized tissue, edema, muscular atonicity and relaxation of the urethral sphincter. These conditions are readily visualized on a voiding urethrogram taken immediately on postoperative removal of the urethral catheter (Fig. 1). The prostatic cavity appears irregular, the sphincters are poorly demarcated and the entire urethra is dilated. A repeat urethrogram two to four weeks after the return of continence will show a smoother and smaller prostatic cavity, a well outlined external sphincter and increased tone of the entire urethral canal.

Permanent incontinence may not be a surgical complication but may be due to an unrecognized lesion of the spinal cord such as is associated with advanced sclerosis, diabetes or tabes. The postoperative urethrocystograms in these cases are characterized by a large atonic bladder, a funnel-shaped vesical neck and diminished or absent sphincteric impressions.

An adequate external sphincter alone can control urination and is the main mechanism for the prevention of incontinence.[11] Laceration or destruction of the external sphincter is the most frequent urethrographic observation in cases of incontinence after prostatectomy (Fig. 18). Damage to the external sphincter may occur in five ways: 1. Intraurethral, a portion of the membranous urethra is accidently removed during suprapubic prostatectomy. 2. Extraurethral, the external sphincter is exposed in the perineum and injured during a perineal prostatectomy. 3. Neurogenic, the sphincteric nerves that traverse the capsule of the gland on its lateral aspects are injured, resulting in anesthesia and paraesthesia of the area. 4. Excrescent, superfluous scar tissues cause rigidity of the prostatic bed and restrict the action of the external sphincter (Fig. 7). 5. Intrasphincteric, loss of urine may also occur after inadequate removal of prostatic tissue, especially when infected and when so situated as to interfere with sphinc-

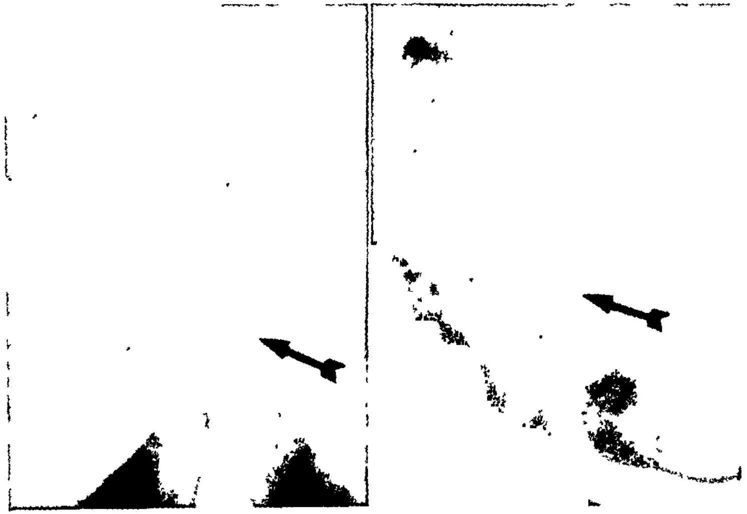

Fig. 11.—Case of J. A. Arrow points to retained lobe after suprapubic prostatectomy. There is also a stricture at the vesical neck.

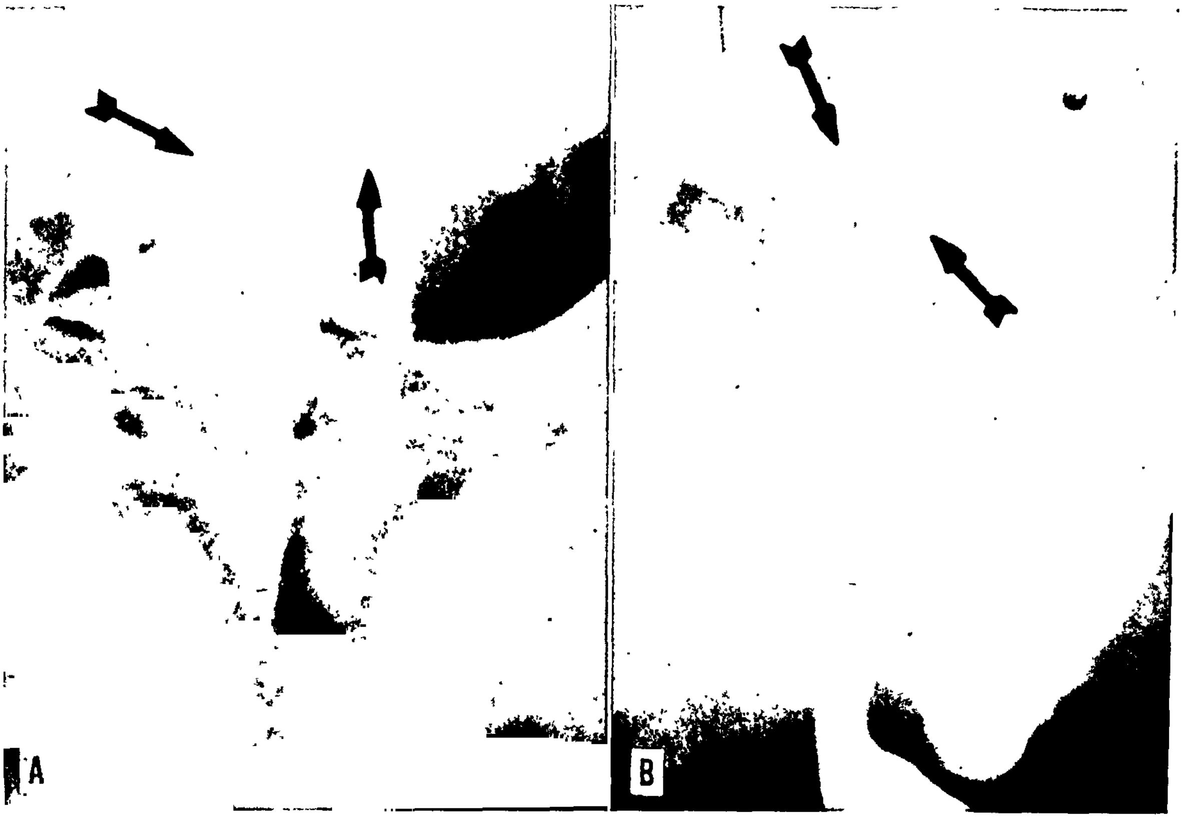

Fig. 15.—Case of J.S., aged 67. Frequency, nocturia and difficulty had existed for two years. On July 5, 1948, acute retention developed. A urethrogram was taken on July 6, showing large intravesical and intraurethral prostatic hyperplasia. On September 31 a retropubic prostatectomy was performed (10 Gm. removed). On Oct. 18, 1949, a suprapubic sinus from which urine drained was present at the lower end of the incision. The arrow in the urethrogram (*B*) points to an impingement of retained prostatic nodules. The observation was verified cystoscopically. The obstructing tissue was removed by transurethral resection, and the suprapubic sinus healed. One year later the patient presented a fair functional result.

teric closure. The urethrogram (Fig. 20) readily discloses the evidence of infection and the size and position of the remnants.

There are many other postoperative conditions,[12] such as ureteral reflux, prostatic calculi and diverticula (Fig. 21), persistent fistula, perforation, hypertrophy of the trigone, and carcinoma of the prostatic bed, for which urethrocystographic study is extremely valuable, and only a lack of space prevents their presentation.

SUMMARY AND CONCLUSIONS

1, Urethrocystographic examination is a most excellent method of appraisal of the end results of prostatic operations.

2. The anatomic reconstruction of the posterior urethra after prostatectomy can be visualized.

3. The structural deformities following surgical complications are graphically portrayed.

4. A permanent record of the etiologic basis of a poor functional result is available for study, comparison and correlation with clinical data.

5. Urethrocystographic study is valuable in the treatment and clinical management of postoperative complications.

RÉSUMÉ

1. L'examen uréthrocystographique est une excellente méthode qui permet d'évaluer les résultats ultimes des opérations prostatiques.

2. La reconstruction anatomique de l'urè-

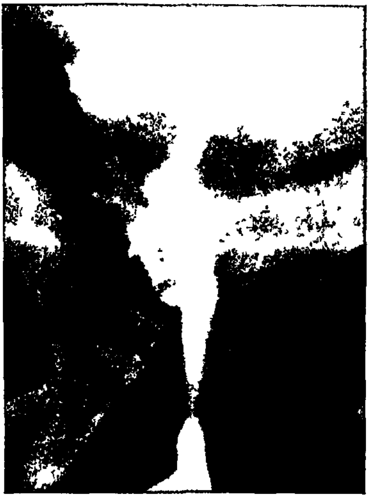

Fig. 16.—Urethrogram taken one month after retropubic prostatectomy. The functional result was poor. *A nodule of adenomatous tissue is present on the right side of the prostatic cavity.* The fuzzy and punched out appearance is due to areas of sloughing.

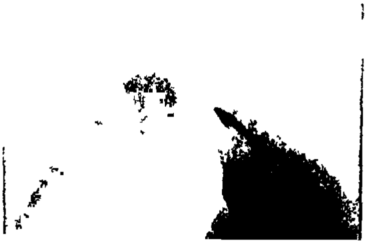

Fig. 18.—Urethrogram taken eight months after a two stage suprapubic prostatectomy in a case of persistent pyuria, nocturia and poor urinary control. The arrow points to an injured area of the external sphincter. The patient was only slightly relieved by urethral dilation.

thre postérieure après la prostatectomie peut être démontrée.

3. Les malformations structurales consécutives aux complications chirurgicales sont portraiturées graphiquement.

4. L'auteur nous fournit un record perma

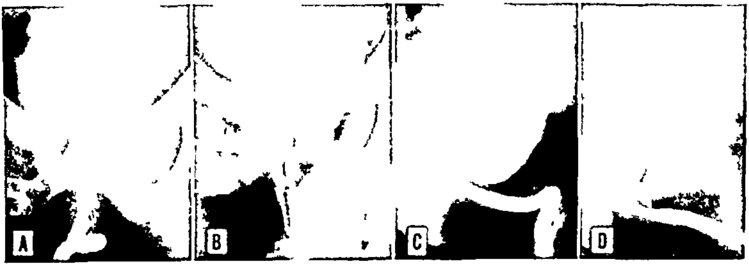

Fig. 17.—Case of J. M., aged 84. A transurethral resection of the prostate was done in 1940, with a good functional result for seven years. In 1948 acute urinary retention developed. *A* and *B*, preoperative urethrograms taken on June 16, 1948, showed marked irregularity and bar formation at the vesical neck. On June 19 a bar of tissue was removed by resection. *C* and *D*, postoperative urethrograms taken on July [illegible] of the same year. The vesical neck is smooth and the obstruction is relieved. The patient has voided satisfactorily except for two episodes of nocturia.

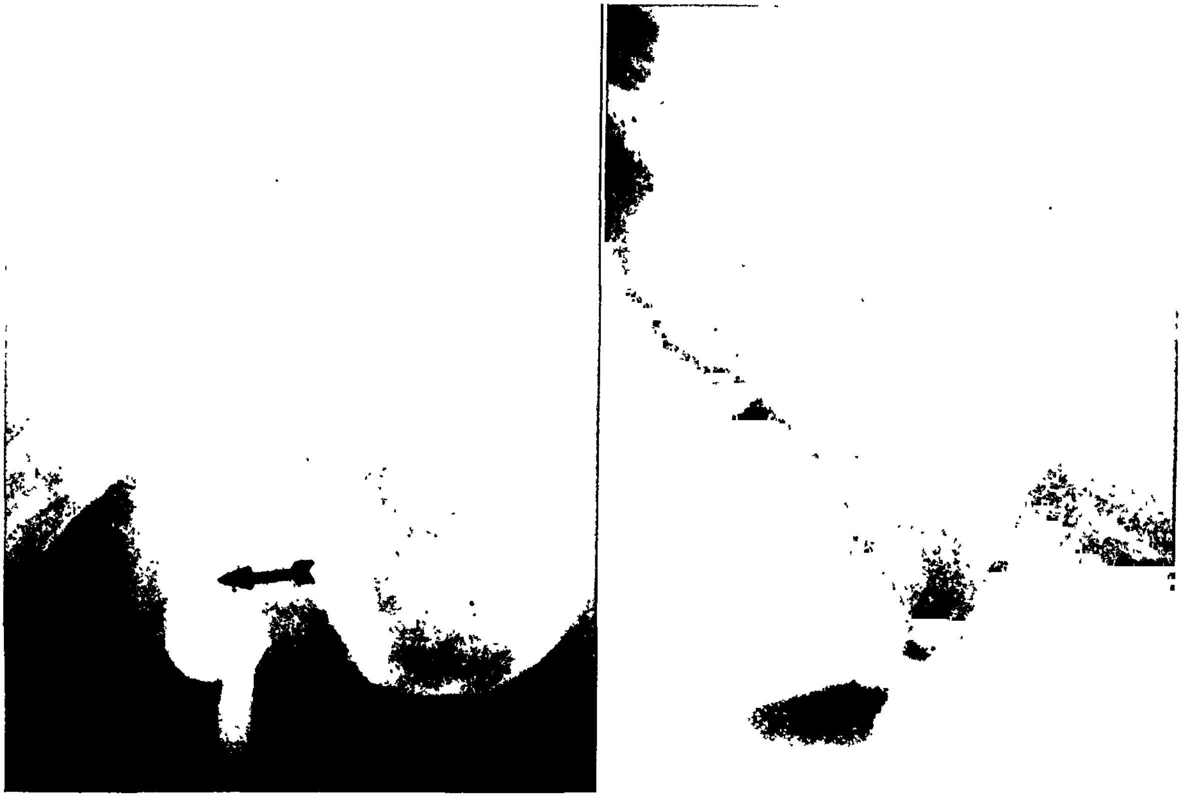

Fig. 19.—Case of H. K., aged 58. Transurethral prostatectomy was done in January 1944. The patient was incontinent after the operation. The urethrogram (taken March 11, 1944) shows irregularity of the entire posterior urethra, the absence of an external sphincter outline, constriction of the membranous urethra and narrowing in the anterior urethra.

nent des bases étiologiques des mauvais résultats fonctionnels. Ces details sont utiles pour l'étude, la comparaison et la corrélation des faits cliniques.

5. L'étude uréthrocystographique est de grande valeur dans le traitement et dans la gérance clinique des complications postopératoires.

RIASSUNTO

1. L'esame uretrocistografico e' il metodo migliore per apprezzare i risultati definitivi delle operazioni sulla prostata.

2. Quest'esame consente infatti una visione diretta delle condizioni anatomiche che si stabiliscono nell'uretra posteriore dopo la prostatectomia.

3. Deformita' strutturali successive a complicazioni operatorie possono essere apprezzate graficamente.

4. Le cause di alterazioni funzionali possono essere in tal modo documentate in maniera definitiva, consentendo dati assai utili per uno studio comparativo con i dati clinici.

5. L'esame uretrocistografico apporta un utile contributo alla cura delle complicazioni postoperatorie.

RESUMEN Y CONCLUSIONES

1. El examen uretrocistográfico es un método excelente de juzgar los resultados finales de las operaciones prostáticas.

2. Puede visualizarse la reconstrucción anatómica de la uretra posterior después de la prostatectomía.

3. Se muestran gráficamente las deformidades estructurales a continuación de las complicaciones quirúrgicas.

4. Se facilita para su estudio, comparación y correlación con les datos clínicos un registro permanente de las causas etiológicas de un resultado funcional pobre.

5. El estudio uretrocistografico es valioso para el tratamiento y manejo clinico de las complicaciones postoperatorias.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die urethrozystographische Untersuchung stellt eine ganz ausgezeichnete Methode zur Auswertung der Endresultate von Prostataoperationen dar.
2. Die anatomische Wiederherstellung der hinteren Harnroehre nach Prostataresektionen kann demonstriert werden.
3. Die Strukturveraenderungen nach chirurgischen Komplikationen werden im Bilde festgehalten.
4. Es wird ein bleibendes Dokument geschaffen, das die Ursache eines schlechten funktionellen Ergebnisses aufzeigt und das zur Forschung zu Vergleichszwecken und zum Studium der Beziehung zu klinischen Daten dienen kann.
5. Urethrozystographische Untersuchungen sind wertvoll in der Therapie und klinischen Handhabung postoperativer Komplikationen.

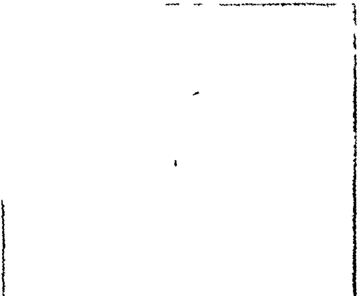

Fig. 20.—Case of H., a physician. Transurethral resection was done in April 1946 for frequency, nocturia and delay in urination due to an intraurethral prostate. The symptoms were worse after operation; there were intermittent incontinence, perineal pain and burning on urination. This urethrogram (taken Oct. 10, 1946) shows a stricture in the bulbous portion of the urethra. The prostatic ducts are dilated. There is a lateral lobe projecting into the prostatic cavity. The patient failed to improve symptomatically in spite of chemotherapy, bladder washes and urethral dilatation.

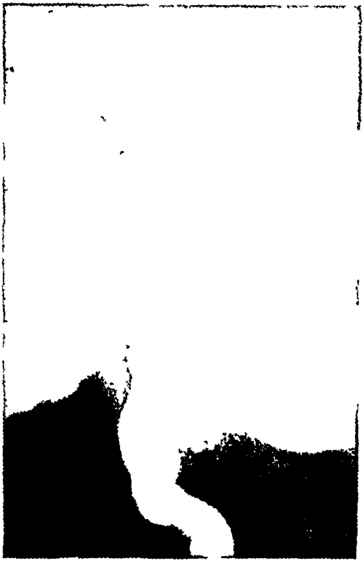

Fig. 21.—Urethrogram taken a few months after a difficult prostatectomy. The posterior urethra is narrowed and rigid. The diverticulum is a result of trauma beyond the line of cleavage.

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Clinical and Roentgenologic Manifestations of Obstruction of the Small Bowel

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I WISH to emphasize the early clinical manifestations of small bowel obstruction and to call attention to the value of a scout film of the abdomen in the diagnosis, differentiation and localization of the obstruction.

The clinical manifestations are definite and characteristic. *The pain is unlike any other form of abdominal colic* and it presents none of the manifestations of a localized disease in any of the four quadrants of the abdomen.

The symptom complex may be divided into three characteristic manifestations and these may well be called the clinical triad of small bowel obstruction.

The abdominal colic of bowel obstruction is peculiar unto itself. It is in no way related to any other type of abdominal pain. It is not confined to any quadrant of the abdomen and causes little or no localized tenderness or rigidity. It is therefore not similar to a localized inflammatory process or to localized colic. It is quite the contrary, it is generalized, diffuse and not associated with tenderness or muscle spasm except in cases of strangulated obstruction. It is not continuous but spasmodic. It starts with a diffuse intra-abdominal cramp increasing in intensity and finally culminating in extreme severity only to subside and recur in a short time. No other form of abdominal colic has these characteristics of diffuseness, periodicity and a relatively normal physical picture. Only in cases of strangulated obstruction and in the presence of adhesive bands attached to the anterior parietal peritoneum will there be localized tenderness or muscle spasm.

Corresponding with this periodic spasm of pain and synchronous with it occur visible peristalsis and audible intestinal sounds of particular diagnostic significance.

Peristalsis is sometimes visible in the early stages of obstruction and in the patient whose abdominal wall is not too thick and obese. It should always be carefully considered and observations should be made to detect its presence during the attack of intestinal colic. It increases in prominence as the pain progresses and often waves of peristalsis can be seen to pass across the abdomen. It subsides with the cessation of pain. It is significant and diagnostic if present but it is not nearly as frequent as *colicky pain and borborygmus.*

Audible borborygmus is synchronous with intestinal colic and visible peristalsis. The sounds increase in intensity finally ending in a loud metallic sound with the cessation of colic and peristalsis. It can be auscultated with the stethoscope and may even be audible to the patient. Pain and borborygmus of this type *are distinctive of obstruction and are not associated with other forms of abdominal colic.* If the obstruction is advanced, pain and peristalsis may be absent and the abdomen silent because of distention and paralysis of the bowel.

These three clinical entities constituting the triad of obstruction of the small bowel *are always present and are usually not recognized with sufficient promptness.*

Vomiting is of significance when it occurs with abdominal colic and its associated symptoms. With the first onset of obstruction, regardless of its location, vomiting may occur immediately as a reflex response. It is a response to the initial shock and not regurgitant from progressive distention of the bowel. It is a protective action of nature to put the bowel at rest and to empty it of its accumulated contents. It may even occur in the presence of obstruction of the colon as a reflex physiologic response. It is of greatest diagnostic significance when associated with spasmodic diffuse abdominal colic. At any rate, regurgitant vomiting is associated only with progressive distention of the proximal bowel and in cases of low bowel obstruction it takes a variable period of time, depending on the level of the obstruction.

The passage of gas or the evacuation of the bowels either spontaneously or by [illegible] may occur and may give a false sense of security of intestinal patency. This has been emphasized by Wangensteen and Goehl.[1] It occurs often in cases of complete intestinal obstruction; its character is reflex, and it represents another example of nature's attempt to put the bowel at rest. It must be remembered that there is nothing physiologically or anatomically wrong with the bowel distal to the obstruction, and it may function in an evacuating capacity with or without stimulation.

External evidence of strangulation is positive indication of obstruction, and the presence of scars of a previous abdominal operation or abdominal distention is significant when associated with the clinical symptoms of obstruction. Distention in simple obstruction is symmetrical, but in strangulated obstruction it is more localized and is more apparent over the loop of distended bowel.

Value of Abdominal Roentgenogram.—Although gaseous shadows in the small bowel have been known for over thirty years to be of some importance as an indication of disturbed continuity, the profession is still not sufficiently impressed with their diagnostic value to institute an early roentgen study in cases of suspected obstruction of the small bowel. Schwarz in 1911 called attention to the gaseous shadows seen in the small bowel in the presence of obstructive lesions and indicated their significance. He advised the use of an opaque medium as a confirmatory diagnostic agent. In 1914 Case described gas shadows in the small bowel as a diagnostic aid in cases of obstruction. Dloiber in 1919 was the first to state that the diagnosis of small bowel obstruction could be made by the gaseous shadows on a roentgen negative and that a contrast medium was not necessary for confirmation. He demonstrated that gas shadows in the small bowel are abnormal and indicative of obstruction.

The typical transverse pattern described by Case is not necessary for a diagnosis of obstruction. A collection of gas in the small bowel in an adult may be considered pathognomonic of intestinal interruption. In very small children gas may be seen in the small bowel and have no diagnostic significance. The accumulation of gas after obstruction is not a late development; it is seen soon after the onset of the obstruction, being easily demonstrable as a rule in four or five hours. The distribution of gas in the small intestine is indicative of the type of lesion present. In a case of simple obstruction the distended intestines may be centrally located and transverse to the long axis of the body, while in the presence of loop obstruction the dilated loops of bowel may assume no definite pattern and distention of the proximal bowel is slow to develop. If the walls separating the loops are thick, it signifies the presence of fluid or exudate. Collections of gas in the large intestine are quite in contrast to collections in the small bowel: the pattern is that of the colon, the bowel wall is thicker, and haustral markings are present.

The stepladder appearance of simple distention of the small bowel indicates advanced obstruction and is associated with a variable degree of abdominal distention.

Valvulae conniventes are seen with simple obstruction and not with advanced strangulated obstruction. The gas is present and can be demonstrated long before distention and this particular pattern develop. Thus it may be said fairly accurately that the roentgen ray can make possible an early diagnosis of small bowel obstruction, that it can demonstrate the presence and pattern of the gas in the obstructed bowel, and that it can indicate the location and probable nature of the obstruction.

From an abdominal roentgenogram one can readily determine whether the distention is in the large or the small bowel. If it is in the large bowel it is usually a closed loop obstruction, the ileocecal valve preventing regurgitation into the ileum. It shows a gaseous colonic pattern. If it is in the small bowel the type and character of the distention depend upon the nature of the obstruction, and from the pattern of distention the urgency of the situation becomes apparent.

When distention occurs postoperatively there may be a question as to whether mechanical obstruction or paralytic ileus is present. In the former event the small intestines are obstructed; in the latter there is distention of both the small and the large bowel. A roentgen film shows the nature of the gaseous distention and distinguishes between the two conditions. If the obstruction is mechanical, the small bowel is distended and the colon is empty, if ileus is present, gaseous distention is apparent in both the small and the large bowel Repeated films may be necessary to determine the certainty of ileus Consideration must also be given to the presence of a so called silent and painless abdomen as a differential point in diagnosis

A simple adhesive band producing proximal distention of the bowel results in no immediate vascular damage, and in advanced obstruction operation may be deferred until rehabilitation of the patient can be accomplished and intestinal decompression established A loop obstruction, volvulus or strangulation, on the *other hand, demands immediate operative* intervention because of the danger of devitalization and intestinal gangrene With such obstruction the bowel does not assume the transverse position but forms one or more distended loops, with no apparent pattern and with little or no proximal distention until the obstruction has been present for many hours The reason for the delay in distention of the proximal bowel is not understood, but it is probably due to the associated hyperemia, edema and neurogenic imbalance Wangensteen *has mentioned* the altered state of the bowel proximal to the strangulated loop as a partial explanation

The simple adhesive obstructions are probably the most common types involving the small intestines and their presence can be detected early by roentgen study The pattern is characteristic and the sequelae of chemical *imbalance dehydration and distention are in* proportion to the extent and level of the obstruction

Obstructions of the small bowel *frequently* occur in association with inflammatory lesions within the abdomen and usually present the characteristic pattern of a progressive proximal distention in which the viability of the bowel is not in jeopardy With this type of obstruction it is not often necessary to intervene surgically as the condition results from *localized inflammation and edema which nar-* row and constrict the adherent bowel to the point of obstruction

Surgical treatment is attended by great danger to the inflamed edematous bowel and may lead to extension of the infection. Intestinal decompression by the Miller Abbott tube

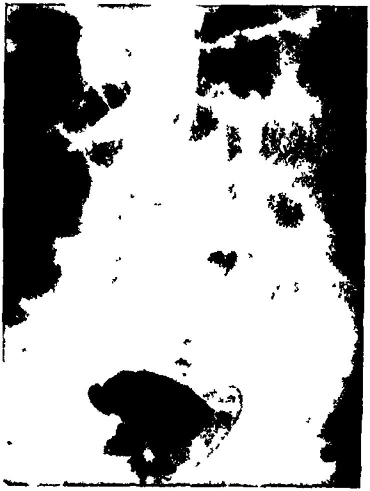

Fig 1 —Simple obstruction Note transverse position of bowel Valvulae conniventes present Blood supply to bowel not impaired, immediate operation not advisable, decompress by Miller Abbott tube

reduces distention and lessens the edema and hypertrophy proximal to the obstruction With intubation and appropriate systemic measures recovery will occur without resort to surgical measures Enterostomy is not required as a more effective decompressive measure is found in intestinal intubation Enterostomy is ineffective, since it drains only a limited segment of the bowel or a few distended loops and has many hazards I have discarded the *procedure*

Occasionally an obscure hernia within the abdomen arouses the suspicion of intestinal obstruction, to be confirmed by a roentgen film A Richter's hernia is very similar The picture resembles that of simple obstruction with the added danger of segmental gangrene of the bowel

In patients of advanced years or whom no previous abdominal op [illegible] n per-formed, the possibili [illegible] mus be given careful [illegible] n b most effectively determined by a barium enema. Such a lesion having been excluded, some variety of small bowel obstruction must be considered.

External Strangulation.—Rarely is there any prolonged delay, because the patient is aware that the long-existing hernia is no longer symptomless but has suddenly become an irreducible mass, firm and hard. The abdominal pain and symptoms are associated with this persistent protrusion. The physician, accustomed to recognize the significance of this clinical entity, promptly calls surgical consultation, and operative intervention is instituted usually before gangrene of the bowel intervenes.

I have not been sympathetic with attempted medical reduction of strangulated hernia. Even if it is successful, nothing permanent has been done to prevent recurrence, and the viability of the reduced bowel is questionable. It is better to reduce the bowel under direct vision, carefully inspect it for adequate circulation and repair the hernial defect. Then and only then can one be certain of the viable continuity of the bowel, and only then has anything been done to prevent a recurrence of the catastrophe. I therefore do not attempt manipulative reduction of any strangulated hernia, but advise immediate surgical repair.

Clinical Observations.—Some years ago I presented my experience in the correlation of my operative data with the previous roentgen diagnosis. I found that a competent roentgenologist was capable of distinguishing between simple obstruction and the strangulation type of obstruction by proper interpretation of the gaseous patterns as portrayed by a scout film of the abdomen.

This differentiation is related to the gaseous pattern assumed by the obstructed bowel and to the presence or absence of the valvulae conniventes. It may well be stated as axiomatic that a simple type of obstruction presents a definite type of intestinal pattern associated with well defined valvulae conniventes, while a strangulated obstruction distends without any gaseous pattern, and, because of extravasated blood in the strangulated loop, no valvulae conniventes are seen.

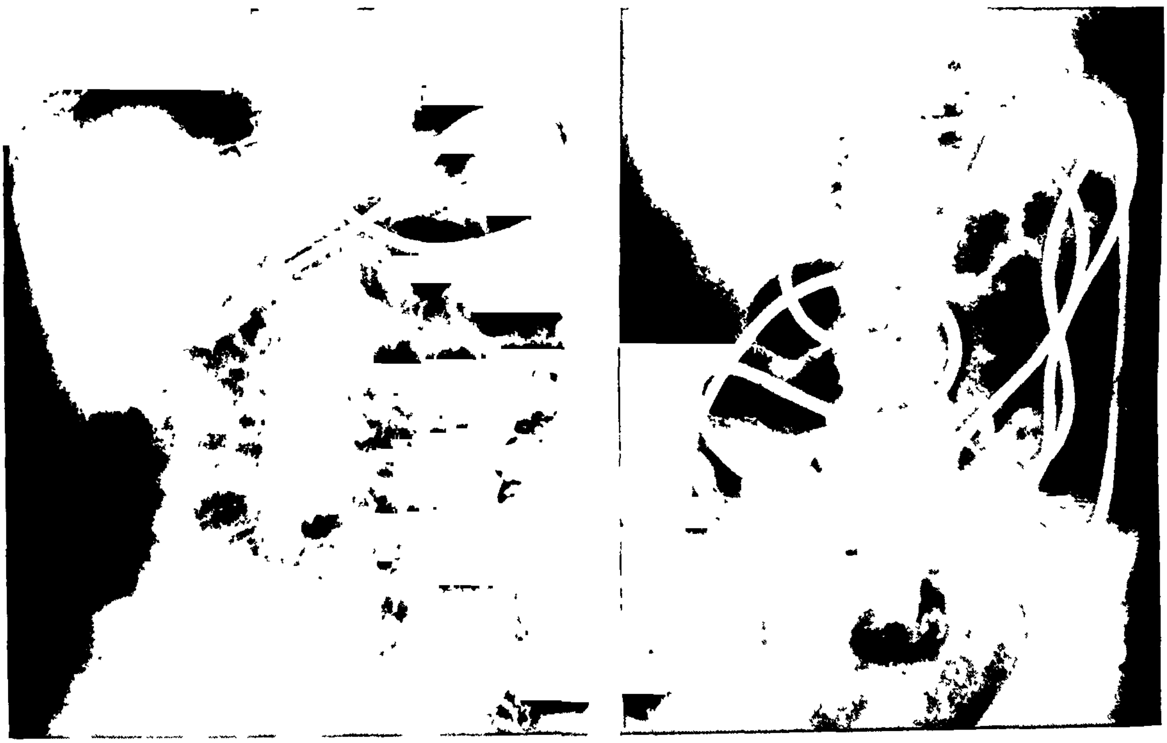

Fig. 2.—Obstruction of the small bowel. Note "stepladder" horizontal position of bowel. Valvulae conniventes are present. (Deflated by Miller-Abbott tube.)

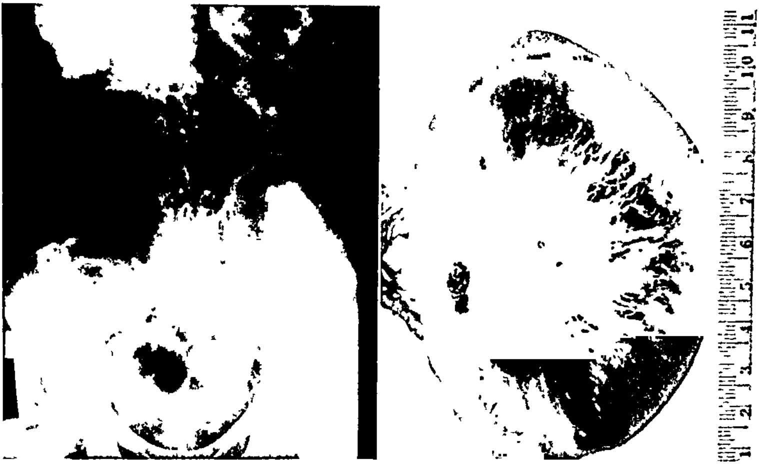

Fig 3—Gangrenous obstruction The plate shows loss of valvulae conniventes with impairment of blood supply to bowel *Note irregular pattern of distended bowel Specimen of gangrenous bowel attached*

Figs 1, 2 and 3 illustrate the types of intestinal obstruction and the advantages of the Miller-Abbott tube

In the past fifteen years, 54 patients have been operated upon for obstruction of the small bowel and 13 others have had a varying degree of obstruction, associated either with an inflammatory process within the abdomen or with a postoperative distention that subsided without operation on use of the Miller-Abbott tube and supportive measures

Analysis of the 54 operative cases resulted in the following data The series included 32 small bowel obstructions from adhesive bands in which no resection was necessary, 14 strangulated obstructions with 7 resections; 4 cases of carcinoma of the small bowel (jejunum; operation; recovery) 1 gallstone obstruction of the terminal portion of the ileum; 1 in rectal pouch not recorded; 1 intussusception, and 2 cases of mesenteric thrombosis

Six deaths followed operation in this series In 1 case of intussusception the patient, a child, died of pneumonia In 1 case of small bowel obstruction following cholecystectomy for stones the patient died of peritonitis In 1 case circulatory collapse followed operation for adhesive obstruction of the small bowel Two deaths were due to strangulated hernias (1 res.—anesthetic death) and 1 to mesenteric thrombosis. These 6 cases represent a mortality rate of 11 per cent.

The clinical and roentgen observations were carefully correlated by a joint conference with the roentgenologist, and a careful check was made at the operating table Accuracy increased with the progress of the study In no case was there a serious error in the preoperative differentiation of simple and strangulated obstruction. The roentgenologic interpretations were made by Dr Ira H. Lockwood, roentgenologist at Research Hospital

Miller-Abbott Tube.—The Miller-Abbott tube was used as an adjunct in most of the operative cases, as either a preoperative or a postoperative measure Clinical and roentgen evidence of suspected postoperative small bowel obstruction or ileus has frequently led to recovery by decompression with the Miller-Abbott tube without operation

In the Research Hospital the procedure of passing the tube is the function of the roentgenologic department. This is usually successfully accomplished by Dr. Lockwood and his associates, whose splendid cooperation is here acknowledged.

The indications for use of the Miller-Abbott tube in cases of small bowel obstruction are very definite. The tube is indicated for simple adhesive obstruction with extensive proximal distention and for obstruction associated with inflammatory lesions. It is valuable in cases of early obstruction to prevent postoperative ileus or further distention. As has been mentioned by Wangensteen, the nature of the obstruction may be such that it will relent after intestinal intubation and operation will be *necessary. This is often true of incomplete obstructions.* It is not indicated for strangulated serviceable after operation to aid in prevention of ileus and to hasten restoration of bowel obstruction as a preoperative measure. It is tone.

The Miller-Abbott tube is not employed as often as it should be. Many have become discouraged with attempts to pass it, and it has fallen into disrepute. The passage of the tube requires patience. The roentgen department of the Research Hospital, over a period of several years, has attempted to pass the tube 212 times and has successfully passed it in 204 instances. The department has successfully passed the tube in 44 instances in the treatment of small bowel obstruction occurring on my service.

In my experience with the Miller-Abbott tube, a definite improvement in the patient's condition has been perceptible in twelve to twenty-four hours. The tube has been of greatest value in cases of nonstrangulated obstruction with extensive proximal distention of the bowel, as an aid in deflating the intestines and making them surgically accessible. Likewise, it has been valuable for obstructions associated with intra-abdominal inflammation. After the inflammation has subsided the obstruction will relent. Distention has been prevented or eliminated, and with the tube well down the intestinal tract, and the bowel deflated the patient can be fed a thin semiliquid diet. I believe it advantageous for colonic lesions, as the small intestines are "telescoped" onto the tube, making a more accessible approach to the colon. It is also a decompression medium after operation.

It is correctly mentioned by Gatch that a bowel that has been dilated for some time will not recover the power to contract for several days after the intra-enteric pressure has been reduced to normal. The tube is of the utmost value and should not be too hastily removed after decompression. It should be more frequently used.

SUMMARY

1. The clinical manifestations of small bowel obstruction are very characteristic and are unlike those of any other abdominal symptom complex.
2. The scout film of the abdomen is of great value from the standpoints of diagnosis, localization and differentiation.
3. Personal conception of the management of external strangulation is stated.
4. The correlation of the clinical and the roentgen diagnosis prior to operation is recorded in a review of cases.
5. The value of the Miller-Abbott tube and the indications for its use are emphasized.

RÉSUMÉ

1. Les manifestations cliniques de l'obstruction de l'intestin grêle sont très caractéristiques et en celà elles différent de tout autre symptôme abdominal.
2. Radioscopie de l'abdomen est de grande valeur du point de vue du diagnostic, de localisation et de différentiation.
3. La conception personnelle de l'auteur du traitement de l'étranglement externe est mentionnée.
4. La revue des cas etablit une correlation du diagnostic clinique et des rayons "X" préopératoires.
5. La valeur du tube Miller-Abbott et les indications pour son emploi sont recommandées avec emphase.

RIASSUNTO

1. I sintomi clinici dell'ostruzione intestinale (i. tenue) sono così caratteristici, da consentire una differenziazione relativamente facile dalle altre sindromi addominali.
2. Radiografie esplorative dell'addome aiu-

tano molto la diagnosi, la localizzazione e la differenziazione dell'ostruzione

3 L'A espone il suo punto di vista riguardo la cura della strangolazione esterna

4 Una correlazione fra i sintomi clinici e gli esami radiografici viene stabilita in base ad una revisione dei singoli casi

5 Viene infine sottolineata l'utilita' del tubo di Miller Abbott, di cui vengono ricordate le indicazioni

ZUSAMMENFASSUNG

1 Die klinischen Erscheinungen des Duenndarmverschlusses sind sehr charakteristisch und unterscheiden sich von denen aller anderen Bauchsymptomenkomplexe

2 Die Leeraufnahme des Bauches ist von grossem Wert in bezug auf Diagnose Lokalisation und Differenzierung

3 Die persoenliche Auffassung des Verfassers von der Behandlung aeusserer Einklemmungen ist dargelegt

4 Die Beziehung zwischen klinischer und roentgenologischer Diagnose vor der Operation wird in Form einer Besprechung von Faellen dargestellt

5 Der Wert des Miller Abbottschen Schlauches und die Indikationen fuer seine Anwendung werden hervorgehoben

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Küntscher Nail Technic for Fractures of Femoral Shaft*

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LINCOLN, NEBRASKA

IN 1940, when Küntscher brought forward intermedullary nailing of fresh fractures of the long bones, his method was quickly accepted as a simple procedure for osteosynthesis that would revolutionize the treatment of fractures. However, this idea of simplicity, the abuse of the principles involved, and the misuse of the method caused frequent criticism and brought disrepute upon the technic at the particular time when it was most needed.

Intermedullary nailing has been known and used for a long time, but the advent of the Küntscher nail technic as a routine procedure in the treatment of fractures is perhaps the one great contribution of German medicine during World War II. Broad experience with it has brought realization of the fact that it is not a simple procedure and that it has definite limitations. But when one realizes these factors and correctly applies the method, the results are truly remarkable.

In this country we knew little of the method until late in the war, when wounded American prisoners began filtering back to our army hospitals with strange rods showing in the roentgenograms of their femurs. My interest was quickened by observing numerous such cases in Czechoslovakia while serving as a member of the Unitarian Service Committee and the UNNRA-sponsored Medical Teaching Mission in 1946. While there I was able to acquire a limited supply of nails and equipment, which gave me my first experience with the method. Again in 1948, on a similar mission to Poland under the sponsorship of the Unitarian Service Committee and the World Health Organization of the United Nations to Poland, I was privileged to study about 80 fractures treated by intermedullary nailing. My concepts and opinions as herein expressed will be dealt with later. They are based upon these experiences and upon my observations of fractures treated in the Lincoln Orthopaedic Clinic.

For fresh transverse and short oblique fractures of the midshaft of the femur this method has no equal. For similar fractures 4 inches (10 cm.) below the tip of the great trochanter and above the lower third of the femur, it has been used very successfully. For certain comminuted fractures in which there is difficulty in retaining full apposition, it sometimes has the distinct advantage of maintaining general contour, but in these cases great care must be used to prevent rotation and shortening. Early ambulation is not possible in such instances.

My very enthusiasm for this procedure leads me to emphasize caution. The major plea of this presentation is to the effect that, if one is to avoid disastrous complications in intermedullary nailing, due regard must be given to:

1. The age and general condition of the patient. (Timing is of the utmost importance. As Bohler has stated in his splendid book on this subject, the operation is never an emergency procedure.)
2. The well founded principles of fracture treatment and traumatic surgery.
3. The strict limitations of the method as applied to the selection of cases in which it is to be used.
4. A thorough knowledge of the technic.
5. The availability of all the necessary apparatus and all the sizes of nails required to reduce the fracture, insert or extract the nail, or cut off a prosthetic device.

Though I recognize the many advantages of closed reduction, which, by fluoroscopic control, simplifies the procedure considerably, my experience has been limited to fractures which did not lend themselves to this method, principally because of the time that had intervened and the severity of the fracture. The excessive manipulative trauma that would be required did not seem justified. My experience with this method has been limited to open exposure of the fracture and retrograde nailing. Since one must observe the strictest aseptic technic when an incision is made above the

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From the Lincoln Orthopaedic Clinic.

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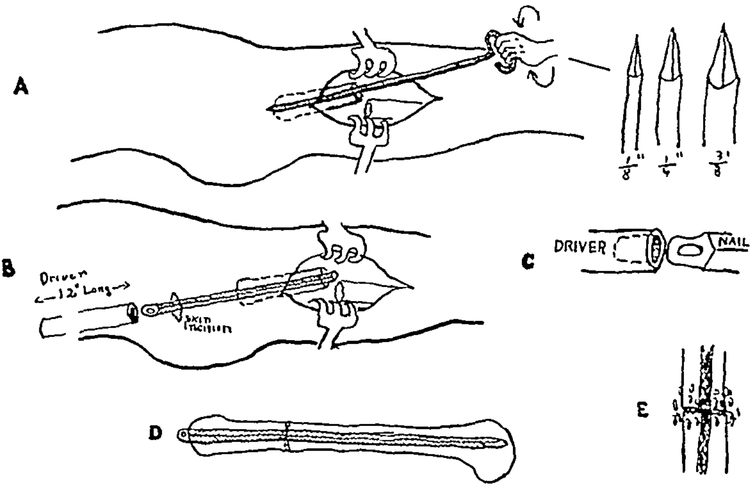

Fig 1 —Intramedullary nailing technic A hole made through end of trochanter for insertion of nail, at right, diameters of rods used for this purpose (see text) B, nail driven through hole in trochanter C slotted driver to fit over head of nail D, nail driven home, leaving head out above E, fracture nailed and packed with cancellous bone chips (see text)

trochanter for blind nailing, I was of the opinion that one thoroughly versed in bone surgery should be able when necessary, to expose the fracture site without great fear of causing infection in the area A slip in aseptic technic, with either method, may prove disastrous The advantages of open exposure of the fracture, accurate reduction and the opportunity to supply cancellous bone material to the area have justified this method in my modest series

Indications for Intramedullary Nailing of Fractures of the Femur —The following points are important

1 The patient must be in good general condition and well prepared for operation

2 There must be healthy skin and good circulatory condition of the extremity

3 If the fracture is compound, the usual procedure of early debridement and closure should be followed Chemotherapy or antibiotic therapy is essential If at the end of ten days or two weeks there is no evidence of infection, I consider the fracture suitable for nailing If possible, the incision should be made distant from the point of compounding

4 Distant foci of infection should be healed before nailing is attempted

5 All transverse and short fractures and some long oblique fractures of the middle third of the femur may be treated by this method It is essential in cases of oblique fractures in this region that the nail penetrate deeply and become implanted in the dense cancellous bone of the lower metaphysis

6 Transverse fractures and some comminuted fractures of the upper third of the femur, provided that they are 4 inches (10 cm) below the tip of the great trochanter, and fractures an equal distance above the knee joint may be treated by this method Again, it is important that the nail be firmly implanted in the distal metaphysis

7 Old nonunions and malunions of the regions mentioned in Points 5 and 6 are usually best corrected (osteotomy for malunion) and

then treated by this method. However, since the muscle stress has occurred in a line of deformity over a long period and the muscles are contracted, the patient should be placed in a plaster of paris spica cast for six to eight weeks to prevent re-formation of the deformity.

Technic of Intramedullary Nailing of Fractures of the Femur.—1. There is usually far more shock associated with fractures of the femur than is immediately evident. Therefore, I prefer to place the patient in traction suspension for a few days to a week prior to operation. A Russell type or Thomas splint will often practically reduce the fracture and make the application of the nail much simpler. Further, this short delay assures accurate evaluation of the risk and provides an opportunity to build up the patient.

2. A twenty-four hour clean-up preparation of the extremity for operation is essential.

3. Choice of anesthesia is important. Spinal anesthesia gives splendid relaxation and is perhaps preferable. However, I also use cyclopropane and intravenous sodium pentothal.

4. Positioning and draping on the operating table is of the utmost importance. The patient lies on the well side. The injured extremity is held manually or by traction in a position of 70 to 90 degrees of flexion with the trunk and in mild abduction while being painted with an approved antiseptic solution from above the ilium to below the knee. Double draping under and over the extremity and draping of the extremity itself from above the knee, including the foot, are necessary for sterile handling. Resting with the fractured extremity held in traction flexion and adduction, the great trochanter points backward and upward with the lateral prominence of the thigh.

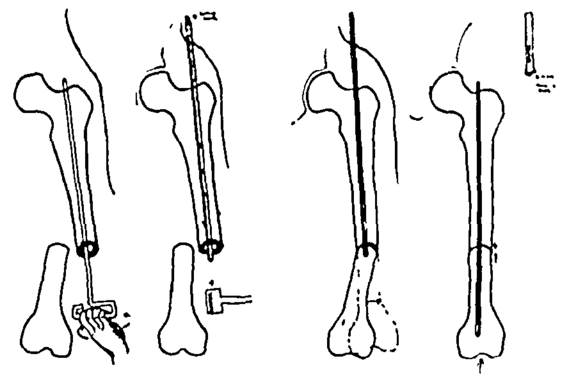

Fig. 2.—Steps in intramedullary nailing technic (see text).

Secure draping is of the utmost importance to assure an adequate operative field.

The incision should be draped so that the contact of the skin with the instruments is avoided.

The trunk should be well supported with sandbags.

The incision should be made no longer than is necessary to expose the site of fracture.

Consideration should be given to atraumatic management of the area exposed. The anterolateral or posterolateral approach is usually preferable in following fascial planes for exposure of the fracture.

In my opinion, minimal damage to muscle tissue bears a direct relation to the safety of exposure as well as to the ultimate result. Usually there is sufficient traumatic stripping of the proximal fragment already evident to permit it to be grasped with bone-holding forceps, and this fragment is lifted sufficiently to permit the medullary auger to be inserted. By manual force and augering rotating pressure a hole is made for the nail at the appropriate spot in the upper cortex of the femoral neck, just medial to the trochanter.

The auger is then removed, and the nail, which has been selected for proper length and size, is carefully driven up the fragment until it presents on the skin of the gluteal region. An incision about 2 cm. in length is made over this presentation. The area is draped so that the nail will not touch the skin. The nail is driven through this incision until only the end is exposed below the end of the proximal fragment.

The distal fragment is then carefully grasped with a bone-holding forceps, the extremity being gently handled by an assistant, and the fragments are approximated and locked over the exposed end of the nail. The fragments are then carefully approximated as to rotation and angulation. The nail is driven with an impacter from above down into the shaft to its seat just above the neck of the femur.

At this juncture a roentgenographic check of the entire length of the femur is essential, both in the anteroposterior and the lateral position, to be sure that the nail is sufficiently long and not too long and is adequately embedded in the lower metaphysis The fragments should be well impacted together before closure Cancellous bone chips packed about the fracture seem to have a favorable effect upon the rapidity of consolidation and union, therefore I use them as a routine in reduction

After conventional closure of the wound the extremity may be placed in some type of flexion fracture frame (Bohler, Braun etc) or in a Hodgen's splint, for two weeks

After-Care —As soon as desired, the patient is encouraged to move the foot and ankle and flex and extend the knee He is encouraged to maintain use of all the muscles of the extremity At the end of a couple of weeks, more active motion for the hip and the knee is urged In three weeks the patient may be up on crutches and increase his weight bearing as he learns to protect the extremity I learned from the Polish surgeons, who use this method almost as a routine that if the patient will learn to walk with a stiff knee the muscles tend to splint the fracture site Therefore, stiff knee walking is absolutely essential during the early stage of ambulation and weight bearing Full motion of the knee and exercise to develop strong muscular protection is essential when the patient is sitting or recumbent

As yet I am somewhat of a coward when it comes to allowing too much liberty I am still inclined to use a plaster of paris spica particularly for persons who are not athletic and do not have good muscle tone, and allow them

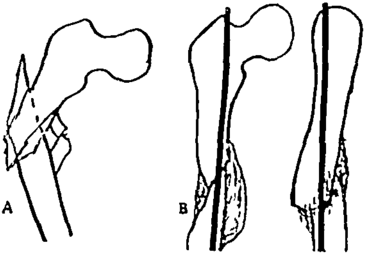

Fig 3 (Case 1) —S Z, aged 40 *A*, before operation *B*, two years later, before removal of nail

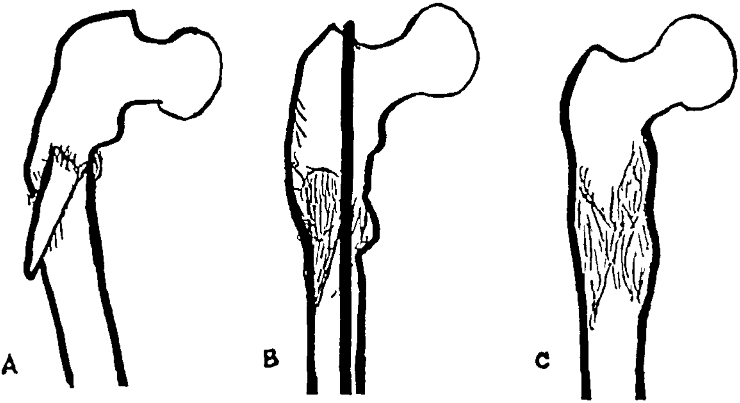

Fig 4 (Case 2) —K W, aged 18 *A*, before operation, *B*, four months after insertion of nail *C*, two years later, nail removed

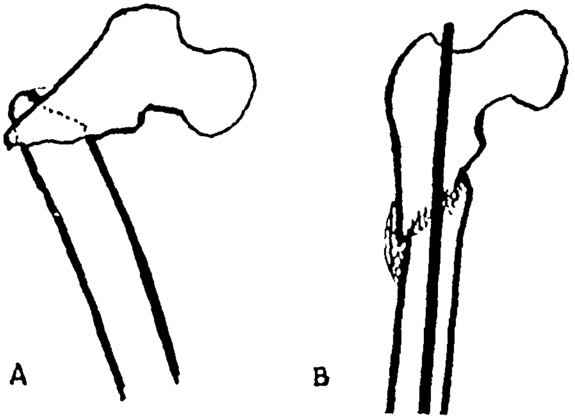

Fig. 5 (Case 3).—C. W., aged 44. *A*, before operation; *B*, May 1947, before removal of nail.

to get up in this and walk after one month before giving them full freedom.

Instruments Essential for Intermedullary Nailings.—One should be provided with the following equipment:

1. A full set of adequate instruments for doing fracture and bone operations.
2. Roentgen facilities. Prior to operation, very accurate check should be made on the length of the well limb, preferably by roentgen study. Nails of known length are laid alongside the uninjured femur for control. By this method the proper length of nail can be determined. However, various sizes and lengths should be on hand at the time of operation.
3. Special instruments used for augering and as guides, and for driving and extracting nails. When in Europe in 1948, I introduced the Peterson vise type pliers in the intermedullary nailing technic and found them invaluable, not only for holding the nail during its insertion but also for removing the nail. Further, these pliers make excellent boneholding forceps. They can be purchased at any hardware store and used without adaptation. However, some instrument manufacturers are making useful adaptations for this instrument.
4. Adequate roentgen facilities for recheck examination.
5. The "know-how" that comes only with practice and experience.

Comment.—Since this procedure allows early ambulation and release of hospital beds, and also contributes to early function and economic usefulness, it has particular importance from an economic angle. Should a metropolitan area become a victim of major catastrophe due to the elements of nature, to bombing or to war, the traumatic surgeon who is not familiar with intermedullary nailing would be caught short when a quick turnover of hospital bed capacity became essential.

FRACTURES TREATED IN POLAND: REPORT OF CASES

In 1948, as has been mentioned, it was my privilege to serve with a medical teaching mission to Poland. Opportunity was there afforded me to examine 45 fractures of the femur treated by Küntscher nailing in 43 persons from the clinics of Professor Adam Gruca of Warsaw, Professor Wiktor Dega of Poznan, and Dr. Sowinski at Kosciuszko Hospital in Piekary, Poland, and to study their records and roentgenograms. This is by no means a study of a consecutive group of fractures; it is limited to patients who could be secured and brought in for review. The line drawings here shown are tracings from roentgenograms. Unfortunately a few of these tracings were lost, but almost every problem to be met in fractures of the shaft treated by intramedullary nailing is covered by the illustrative material available.

Fresh fractures were seldom immobilized in plaster of paris; rather, for two or three weeks after operation they were usually placed in a Bohler frame or some modified incline frame

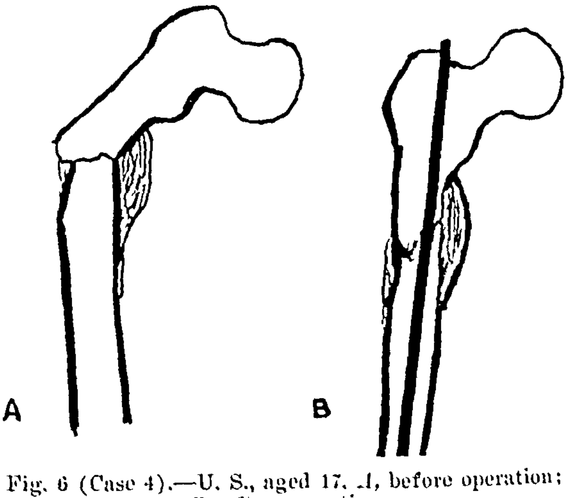

Fig. 6 (Case 4).—U. S., aged 17. *A*, before operation; *B*, after operation.

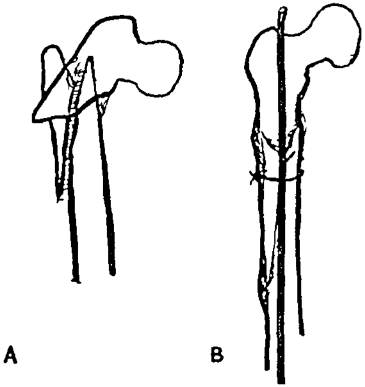

Fig 7 (Case 5)—H S, aged 37 *A* before operation *B* eleven months later

with only enough traction to stabilize the extremity With the femur so inclined in mild flexion, motion of the knee was started in a few days and encouraged throughout convalescence, particularly while in bed and when sitting, to prevent loss of muscle tone and maintain function

Patients with old deformities, after correction and nailing were usually placed in a spica plaster cast but encouraged after a few weeks to be ambulatory on crutches If these fractures were not immobilized there was often a tendency toward muscle pull in the direction of the previous deformity to the extent of bending the nail

For the most part the fractures treated at the clinics of Professors Gruca and Dega were old nonunions, malunions, and fractures with long histories of osteomyelitis from compounding, those in Sowinski's series were mostly fresh fractures, operatively treated as early as indicated the patients having been brought immediately to the hospital after injury

Since fluoroscopic control was not readily available, reduction and blind nailing were not used The site of fracture or deformity was exposed by incision, retrograde nailing was performed, and the nail was guided across the fracture line with accurate visual approximation of the fragments

These cases have been classified under three headings

1 Fractures of the upper third of the femur

2 Fractures of the middle third of the femur

3 Fractures of the lower third of the femur

The order of presentation is as follows

1 A brief summary of the pertinent facts in each case, diagrams of the roentgen picture before and after nailing (when available), observations as to the result

2 A general summary of information on the group as a whole

3 A brief discussion of unusual features of interest

4 Conclusions as regards each group

FRACTURES OF THE UPPER THIRD OF THE FEMUR

Case 1—Patient S Z, aged 40 Cause of fracture ski accident Date of injury Feb 23 1946 Condition simple comminuted fracture, nonunion shortening Treatment and course nail inserted June 15, four months after injury, spica cast worn three months, no weight bearing until removal of cast, nail removed in June 1948 Result Patient is skiing once more and is a mountain climber and guide Two years after operation the pin was removed, as it was needed for another fracture

Case 2—Patient K W, aged 18 Cause of fracture gunshot wound of right femur Date of injury 1944 Condition outward bending deformity and union, extensive healed lateral scar shortening, pain in hip Treatment and course nail inserted July 1947, weight bearing in plaster spica after nine weeks, cast removed in three months, nail removed in January 1948 eighteen months later Result splendid, function perfect

Case 3—Patient C W, aged 44 Cause of fracture motorcycle accident Date of injury June 1945 Condition high oblique fracture, nonunion, outward deformity, loss of substance absorption Treatment and course nail inserted April 1946, plaster spica for three months, nail removed in May 1947, thirteen months later Result 2 5 cm shortening compensated by lift, good result

Case 4—Patient L S, aged 17. Cause of fracture sports accident Date of injury Feb 18, 1945 Condition malunion with outward deformity Treatment and course nail inserted Jan 24, 1947,

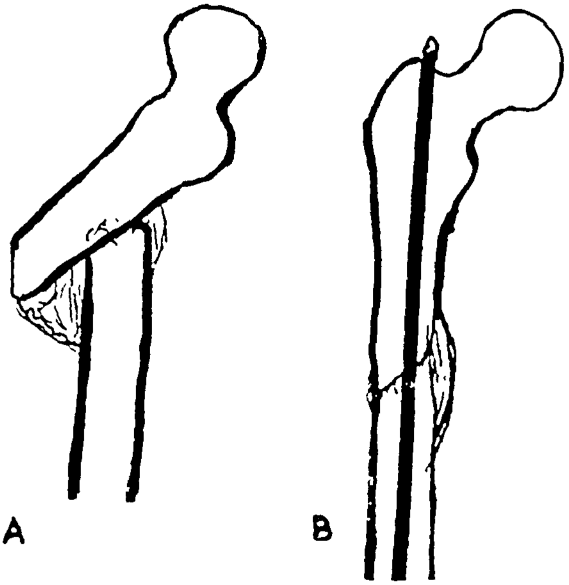

Fig. 8 (Case 6).—P. G., aged 37. *A*, at operation; *B*, eleven months later.

after osteotomy; spica cast and early weight bearing for three months; nail not removed. Result: good function; 90 degree knee flexion; no shortening; patient has limp.

Case 5.—Patient: H.S., aged 37. Cause of fracture: fell out of window; both femurs fractured. Date of injury: June 1946. Condition: right malposition; loose lateral ununited fragment. Treatment and course: operation (unsuccessful) October 1946; nailed January 1947; loose fragment held with wire; no cast; early weight bearing, one month; nail not removed. Result: left fractured femur healed with satisfactory approximation; good union; patient still disabled and walks with cane because both legs were involved.

Case 6.—Patient: P.G., aged 37. Cause of fracture: gunshot wound in both femurs. Date of injury: March 1945. Condition: left femur healed with some limitation of knee motion of right femur when operated on; malunion; severe deformity. Treatment and course: nail inserted June 1947; early weight bearing with crutches for three months; no cast; nail not removed. Result: good union; severe soft tissue loss; both femurs fractured; patient still disabled and walks with cane.

Case 7.—Patient: H.J., aged 38. Cause of fracture: fall resulting in a fused hip. Date of injury: July 1946. Condition: malposition; fusion not disturbed. Treatment and course: nail inserted August 1946; patient in spica cast three months; early weight bearing one month; nail not removed. Result: good; patient has stiff hip.

Case 8.—Patient: G.S., aged 36. Cause of fracture: motorcycle accident. Date of injury: May 1946. Condition: two fractures, malposition; nonunion upper third and junction of middle and lower third. Treatment and course: nailed June 10, 1947; plaster spica three months, no weight bearing; nail not removed. Result: good functional result and good position; nearly full motion of knee; patient very active and working one year after operation.

Case 9.—Patient: T.W., aged 41. Cause of fracture: mine accident, both femurs; scrotal wound; lost testicle; highly septic. Date of injury: March 21, 1948. Condition: right simple comminuted upper third; also, junction of lower and middle third; left simple oblique fractures of lower third of femur. Treatment and course: operation June 28; because of general sepsis was in double spica for two and one-half months (left femur held satisfactory position); there was decubitus of right popliteal space; lower fragments held good position but upper third had outward deformity and nonunion; nail goes only to lower fracture; cast: double spica. Result: out of cast July 20; good stability; too early to evaluate, but patient making good progress and beginning to get around.

Case 10.—Cause of fracture: war casualty, C.C.F. Date of injury: three months prior to operation. Condition: nonunion; advanced atrophy. Treatment and course: nailed three months after accident; cancellous chips used; spica cast one month; weight bearing, one month; four months, walking; nail not removed. Result: walking without support in four months; working nine months later.

Case 11.—Patient: aged 45, obese woman. Cause of fracture: bus accident. Condition: long oblique fracture; angulation; nonunion. Treatment and course: nailed some months after accident; nonunion; cancellous chips used; nail not removed. Result: last roentgenogram, one year later, showed slight outward angulation; bony cap over end of

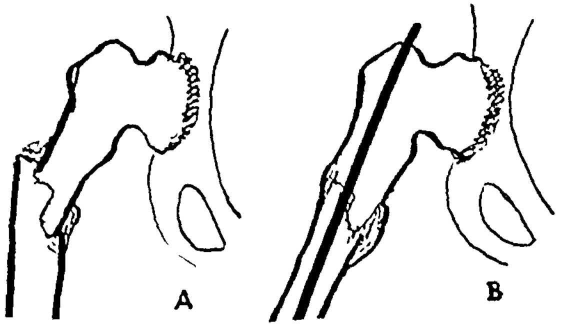

Fig. 9 (Case 7).—H. J., aged 38. *A*, before operation; *B*, after operation.

pin above greater trochanter abundant callus good functional result

CASE 12—Patient woman aged 22 Cause of fracture industrial accident compound Date of injury eight months before operation Condition patient had lost 10 cm of bone substance from osteomyelitis deformity malunion Treatment and course operation long oblique osteotomy nail put under traction cancellous bone chips patient walking in spica cast three weeks later in cast two and one half months nail not removed Results last roentgenogram one year later showed good callus 70 degree flexion of knee 3 cm shortening patient walks well does work of *housewife one year after accident for six month* sciatic nerve paralyzed from partial paralysis of anterior tibial

CASE 13—Patient M A aged 8 Cause of fracture automobile accident Date of injury April 10 1948 Condition poor position with traction nailed April 23 thirteen days after accident no *cast, walked after two weeks nail not removed* hospitalized sixteen days roentgenograms earlier and later during treatment Result after two months July 1948 good function and firm union

CASE 14—Patient F I aged 46 Cause of fracture mine accident Date of injury July 8 1947 Condition traction two months nonunion and *bowing deformity* Treatment and course nailed September 11 1947 two months later no cast

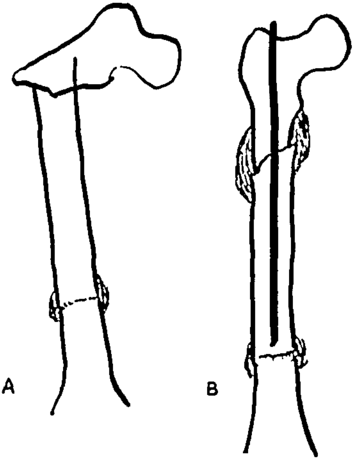

Fig 11 (Case 9)—I W aged 41 *A* before operation *B* fracture after nailing in cast

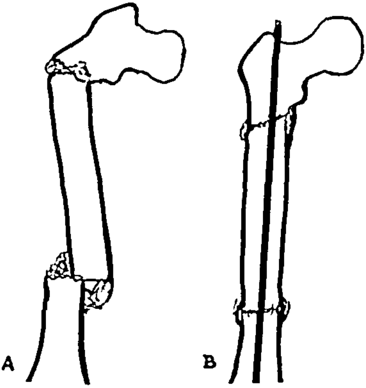

Fig 10 (Case 8 — G S [illegible] *A* before operation *B* after operation

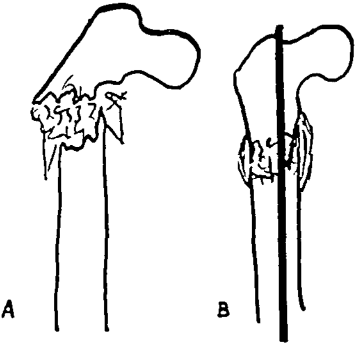

Fig 12 (Case 11) —W [illegible] fracture [illegible] before operation *B* [illegible] after [illegible]

October 6 1947 full weight bearing less than one month after operation [illegible] July 13 1948 after [illegible] abundant callus [illegible] of fracture [illegible]

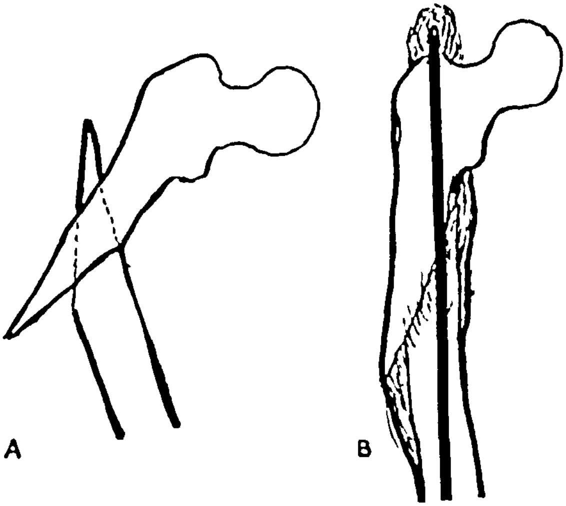

Fig. 13 (Case 11).—Fracture in obese woman aged 45. *A*, deformity before operation. *B*, one year after. Note abundant callus.

removed; hospitalized five weeks. Result: July, 1948, working as miner for past six months; pin removed because needed; not as complete resolution of callus as that usually seen, but clinical results considered excellent.

CASE 15.—Patient: T.A., aged 43. Cause of fracture: mine accident. Date of injury: Jan. 21, 1947. Condition: traction two months; full length; no union. Treatment and course: cast March 21 and May 27: nonunion persisted; nailed four months after May 27, 1947; patient had high postoperative temperature; relieved with penicillin; no cast; walking with crutches in six weeks; nine weeks, no crutches; some limitation of knee action; nail removed July 17, 1948, after fourteen weeks; good union but a bone defect on outer side; last roentgenograms when pin removed; hospitalized six weeks. Result: patient working five months after operation; went to work one week after removal of nail; good union and function.

STATISTICAL SUMMARY

Number of fractures of upper third of femur, 15
Sex: male, 13; female, 2
Average age: adults, 36 years; child, 8 years

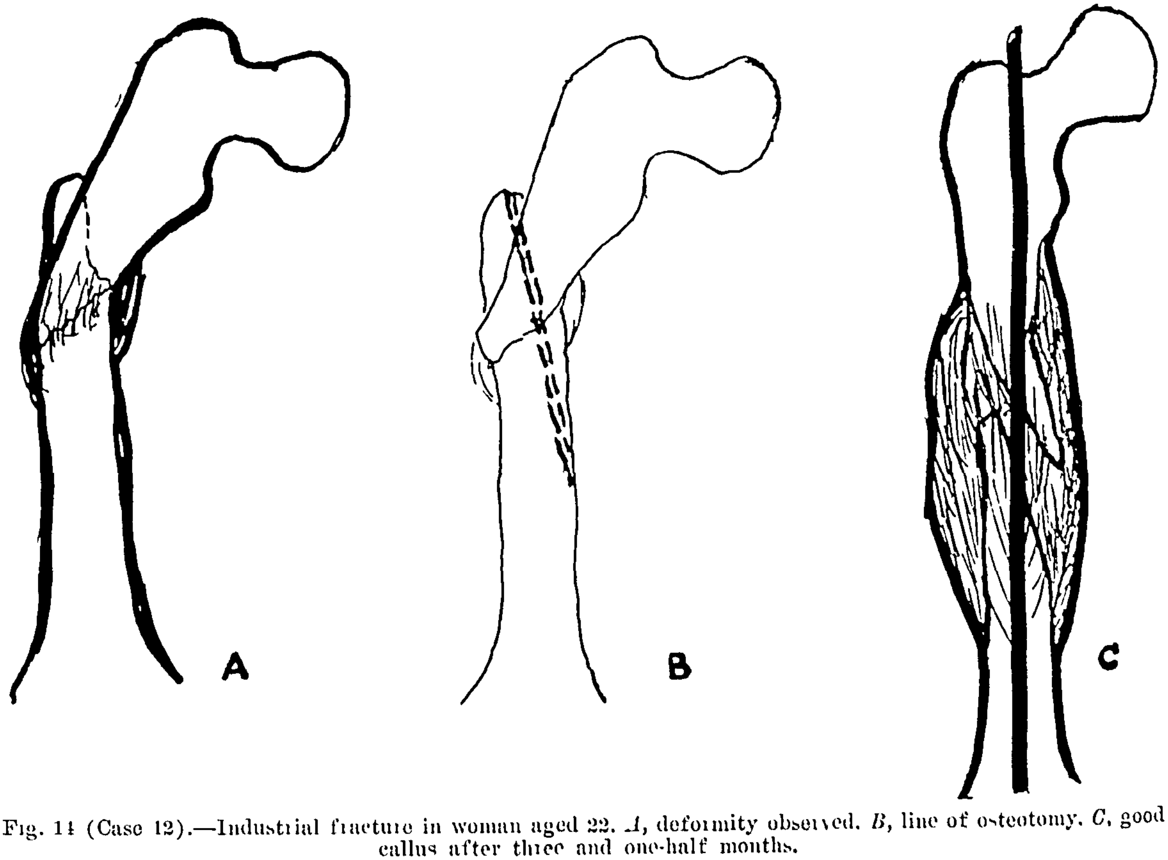

Fig. 14 (Case 12).—Industrial fracture in woman aged 22. *A*, deformity observed. *B*, line of osteotomy. *C*, good callus after three and one-half months.

Cause of fracture

Occupational accidents	4
Sports accidents	2
Motor accidents	4
Falls	2
Gunshot wounds	3

Average lapse of time between accident and Kuntscher nail 9 months

Only one fresh fracture was nailed within the first two weeks Several were nailed as soon as it was realized that other methods might fail Eight were nailed within six months and 3 were nailed more than twenty two months after injury One was nailed about three years after the accident

Type of fracture

Simple	11
Compound	4

There was some comminution in most of these fractures

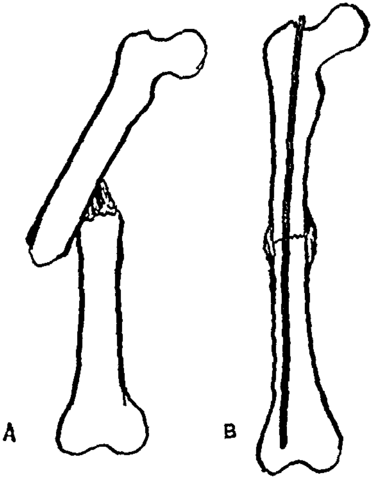

Fig 15 (Case 16)—P E, aged 11 A, before operation B, five months later, just before removal of nail

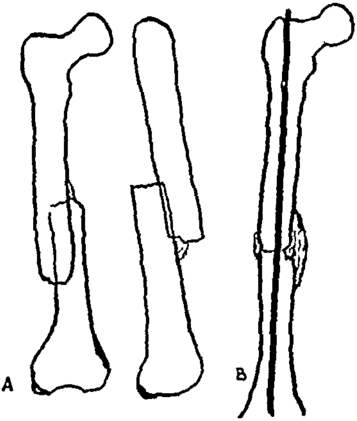

Fig 16 (Case 17)—G I, aged 28 A, before operation B three months later in cast

Complicating trauma

Both femurs fractured (only 1 femur in each case was nailed)	3
Fracture of the shaft in middle of lower third	2
Severe scrotal and perineal injury	1

Condition of fracture when nailed

Malposition (child treated in traction thirteen days)	1
Shortening (loss of substance)	2
Nonunion or delayed union	7
Malunion	5
Deformity (as a major factor)	15

After treatment.

Plaster of paris spica (approximately three months)	9
Weight bearing with crutches after four to eight weeks	9
No cast (of these, 3 had complicating injuries that kept them off their feet for three months)	6
Removal of nails	5

The average period for which the nail remained in the femur was sixteen months In no instance did the [illegible] use any [illegible]tions. In several [illegible] found qu

Of the remaining 10 *patients*, 1 has had the nail in place less than a year and 9 have carried it from one year to eighteen months.

COMMENT AND CONCLUSIONS

Femur nails of the clover-leaf type were scarce in these clinics; therefore, when a nail was needed it was often necessary to persuade a former patient to come to the hospital and have his nail removed. Most of these people were working and disliked giving up a week's time for this procedure. Often it took considerable persuasion to inveigle them back to the hospital. At times it was necessary to frighten them by emphasizing the danger of leaving the metal in the bone, lest it affect the marrow and the blood.

Examination of all the roentgenograms before and at intervals after operation showed early resolution of the abundant callus and good solid early healing, with 2 exceptions. One of these (Case 14) showed a defect in the line of fracture at the time the nail was removed ten months after reduction, but there was abundant callus and the man had been at work as a miner for six months. This nail was sorely needed for another patient (Case 15), who had a defect on the outer side of the shaft, due possibly to absorption of a loose fragment which might have been infected, as the patient's temperature was rather high for something over a week after the operation. (The operative wound was not drained.) His temperature finally subsided after adequate penicillin therapy. He worked steadily in the mines from five months after his operation. The defect was discovered fourteen months after the operation, when he was prevailed upon to allow the nail to be removed. Seven days after removal of the nail he was at work again in the mines.

Three patients (Dega) with nonunion and deformity treated by nailing had cancellous bone chips packed around the fracture site when the nail was inserted. The roentgenograms of these fractures showed very early organization. One of them (Case 12), having 10 cm. of shortening owing to the fact that it was a compound fracture with osteomyelitis, gained about 7 cm. of length by means of a long oblique osteotomy of the upper part of the femur with skeletal traction after the nail was put in and chips packed around the region. This procedure was followed by good union in the shaft of the femur. The patient still had the nail when examined one year after operation. She had had some sciatic pain and perineal paralysis for several months, but had entirely recovered and was doing full-time work fourteen months after the operation, or two years after the injury.

Three patients had severe fractures of both femurs, with some other complicating trauma. All are ambulatory but with varying degrees of disability. One (Case 9), who had a compound injury of the pelvis, was still using two canes for stability three months after injury. Another (Case 5) was using one cane eighteen months after nailing. The third (Case 6) had a 1945 gunshot wound with extensive loss of soft tissue. Although he walked without support, he had considerable limitation of flexion of the knee. The interesting common feature in these cases was that, in each instance, only one femur was nailed, and the function in that extremity was better by far than that of the femur that did not have the Küntscher nail. Probably this was because early activity could be encouraged in the nailed extremity.

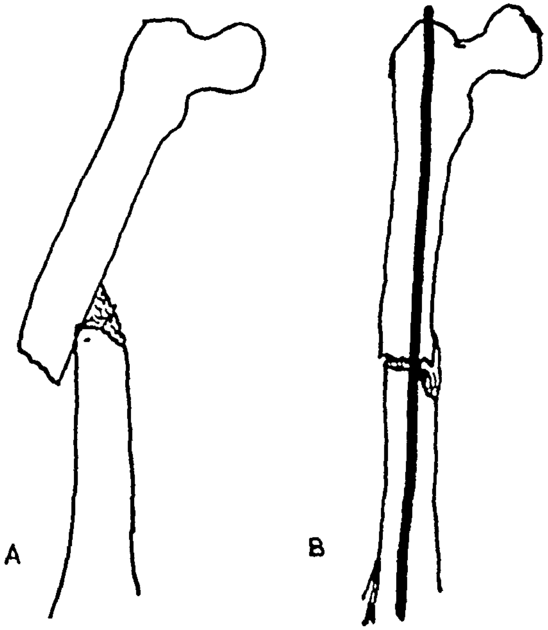

Fig. 17 (Case 18).—L. B., femur fractured by fall. *A*, before operation. *B*, three months after operation, in cast. There is little callus.

The two short oblique fractures (Cases 3 and 5) were almost above the upper limits for nailing, but skillful management and protection produced satisfactory results.

The two double fractures of the shaft of the femur (Case 8 and Case 9) are included because each was associated with a fracture of the upper third. One patient (Case 9) in this group had fractures of both the upper and the lower third, but only the upper (deformed) was treated by nailing. The lower fracture healed satisfactorily and therefore requires no comment.

Three of the patients with nailed fractures were doing heavy labor six months after nailing, one in five months, another in nine months. This seems to me a rather striking phenomenon. The function and strength of the injured extremity was *normal. In one of these* cases there was considerable atrophy of the thigh, but the strength and the muscular tone were good.

Among the patients with pronounced disabilities, of whom there were five, was H. J. (Case 7) who had a good functioning knee *but a stiff hip due to healed tuberculosis.* One patient (Case 4) had only 90 degree flexion of the knee, another (Case 12) 70 degree flexion. There were two fractures with shortening, one with 2.5 cm., the other 3 cm. The 45 year old obese woman (Case 11) was *not very active*, but had no true dysfunction. I doubt whether the fracture had anything more than an incidental bearing on her inactivity.

The patients treated by Professor Gruca in Warsaw and those treated by Professor Degá in Poznan, for the most part, had long standing *deformities with marked disability* and most of them were immobilized in a plaster of paris spica for about three months after the operation. But several of these were sent home on crutches after about a month. Of course, those who had *both legs fractured* could not be made ambulatory at an early stage and were hospitalized for long periods. At the Kosciuszko Hospital, where fresh fractures were treated by the Kuntscher nail, casts were uncommon and the patients *went home* on crutches from two to four weeks after operation. In 1 patient (Case 11) who began to bear weight without a cast four weeks after operation, an outward angulation developed and was not discovered until after healing was complete. Fortunately, this angulation was not severe, and the functional result was splendid. There was but one postoperative infection, which was successfully treated by antibiotic therapy.

Ten of the 15 patients with fractures of the upper third of the femur returned to their former occupations. Because of infection, comminution and loss of tissue, there was marked shortening in 3, but this was compensated adequately by lifts. Four of the patients had rather severe disability, but the treatment in itself could not be held responsible *for that.* Of these 4, 2 had fractures of both femurs, the sciatic nerve was severed in the third, and the fourth had undergone fusion of the hip for tuberculosis prior to the fracture.

In some of the old deformities observed in the entire series treated by this method, there was limitation of knee flexion prior to operation, but correction of the deformity always improved function of the knee. Many showed atrophy of the quadriceps muscle, which nevertheless in most cases showed good function.

According to my observation in these 15 cases and many other derotation subtrochanteric osteotomies in children treated with the Kuntscher nail, this procedure offers perhaps *one of the best surgical approaches for fractures* 4 inches (10 cm.) below the upper tip of the trochanter and the middle third of the femur.

FRACTURES OF THE MIDDLE THIRD OF THE FEMUR

CASE 16.—Patient P. E., aged 11. Cause of fracture: sports. Date of injury: June 1947. Treatment and course: reduction and nail, September 1947, after lapse of four months. Condition of fracture on reduction: malunion with overriding deformity, shortening, no cast, weight bearing, three weeks on crutches, full weight bearing in three months, nail removed January 1948. Result: equal length, no deformity, all movements normal.

CASE 17.—Patient G. I., aged 25. Cause of fracture: traffic accident. Date of injury: October 1947. Condition of fracture on reduction: nonunion, overriding, shortening deformity. Treatment and course: reduction and nail, January 1948, after a four month lapse, patient in spica cast for three months, weight bearing after one month, nail not removed. Result: roentgenogram after six months showed good position; considerable callus apparent; good function; clinical result: patient working.

CASE 18.—Patient: L.B. Cause of fracture: fall. Date of injury: October 1947. Condition of fracture: malunion, junction upper and middle third. Treatment and course: operation March 1948, six months after accident; patient in spica cast three months; weight bearing after one month; last roentgenogram through cast three months after operation; little evidence of callus. Result: patient out of cast in three and one-half months and walking with crutches, but little evidence of callus; marked thickening about fracture site.

CASE 19.—Patient: Y.A., aged 30. Cause of fracture: fall. Date of injury: March 1948. Condition of fracture: nonunion; distraction. Treatment and course: traction in bed; nailed May 1948, two months later; fracture in spica cast three months; weight bearing in one month; nail not removed; last roentgenogram taken in cast at two and one-half months. Result: evidence of callus only on medial side of fracture two and one-half months after operation, weight bearing with crutches.

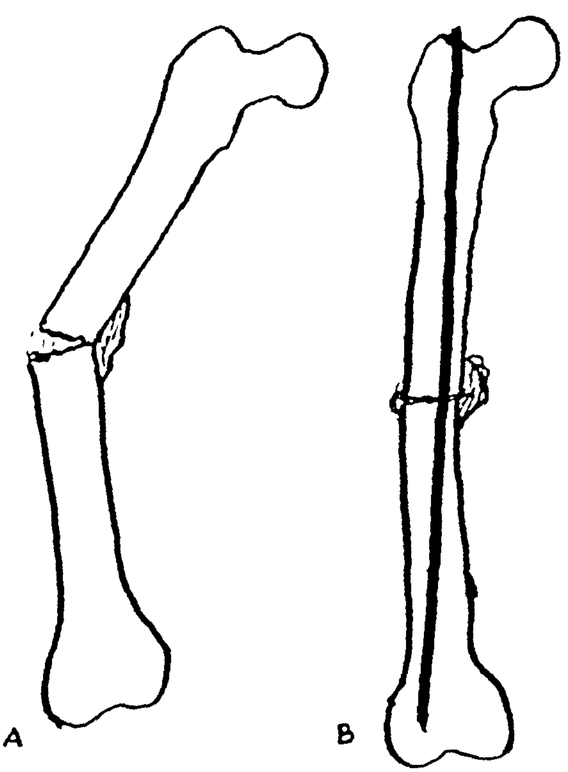

Fig. 19 (Case 20).—K. G., aged 40. *A*, before nailing. *B*, four months after straightening of bent nail.

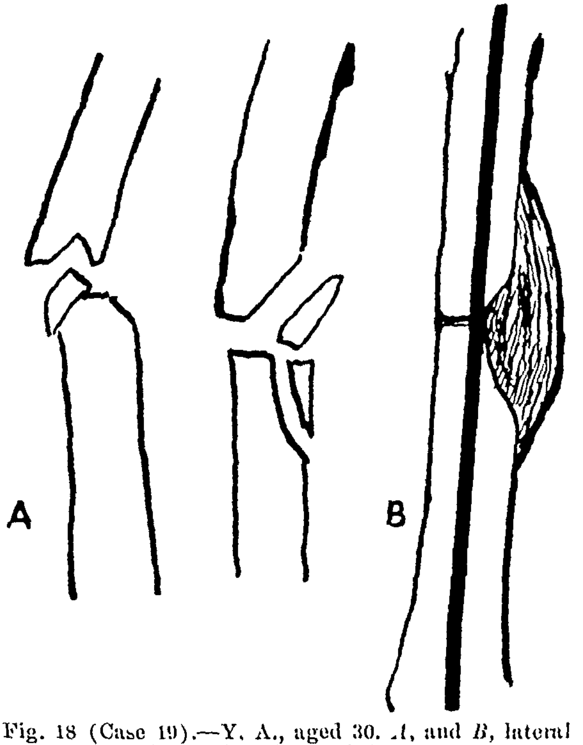

Fig. 18 (Case 19).—Y. A., aged 30. *A*, and *B*, lateral and anterior views of fracture.

CASE 20.—Patient: K.G., aged 40. Accurate dates not available but course of convalescence of sufficient importance to record: patient had malunion when operated upon; weight bearing three months after cast removed; pin bent, but was straightened by bending in spica cast, which was wedged at site of deformity; patient placed in another spica cast for three months with weight bearing. Result: ultimate functional result very promising four months after straightening; some limp, limitation of knee flexion, but full extension; patient walked, squatted and climbed stairs without help.

CASE 21.—Patient: J.S., aged 22. Cause of fracture: mine accident. Date of injury: Oct. 17, 1947. Condition of fracture: simple transverse. Treatment and course: nailed October 18, 1947; patient walking in thirty-two days; no cast; nail removed March 3, 1948, after five months; hospitalized two months; last roentgenogram after two months in hospital. Result: patient back at full-time work March 25, five and one-half months after injury; good result.

CASE 22.—Patient: M.E., aged 15. Cause of fracture: fall from window. Date of injury: April 30, 1948. Condition of fracture: simple long oblique; high temperature for five days. Treatment and course: penicillin; nailed April 30, 1948; patient walking in two weeks; no cast; nail removed July

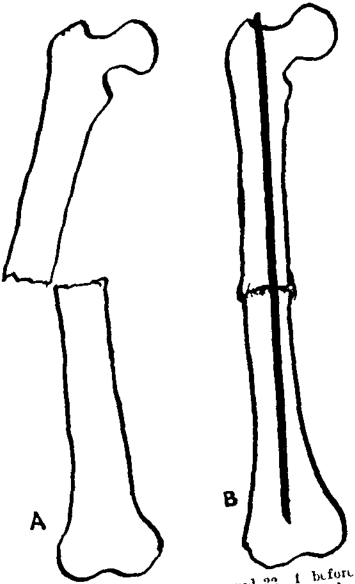

Fig 20 (Case 21)—J S aged 22 A before operation B, after two months in hospital

17, 1948, after three months because pin was needed, hospitalized four weeks Last roentgenogram showed very good callus Result very large callus, good position of thigh and knee patient seen just before pin was removed

Case 23—Patient S J aged 33 Cause of fracture mine accident Date of injury Dec 20 1947 Condition of fracture simple transverse extensive soft tissue wound in upper thigh which closed by granulation Treatment and course nailed Dec 20, 1947 patient walking January 1 in one month nail removed July 6 after six months, patient hospitalized six weeks roentgenogram on April 1 showed good callus on July 6 good resolution of fracture Result patient returned to work July 11 no disability

Case 24—Patient aged 28 Condition of fracture simple overriding for one month, no contact of fragments Treatment and course nailed one month after accident cancellous chips used patient walking in cast in two months roentgenogram showed abundant callus after three months Result

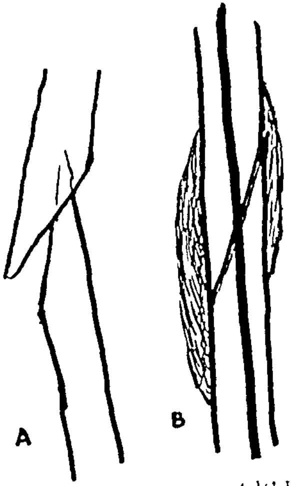

Fig 21 (Case 22)—M E, aged 1 A before operation B excellent callus formation several months later

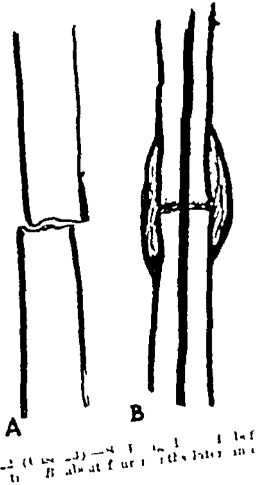

Fig 22 (Case 23)—S J aged 3 A before operation B about four months later

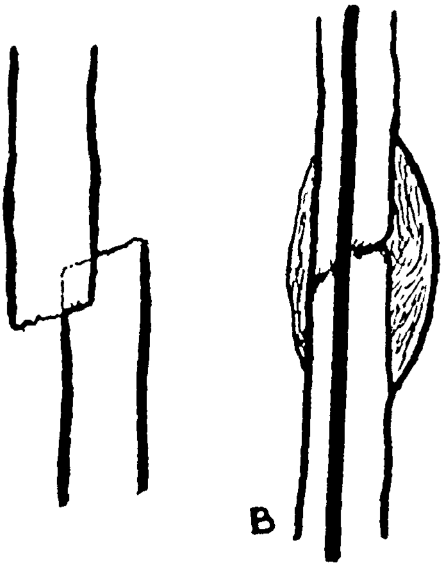

Fig. 23 (Case 24).—Patient aged 28. *A*, before operation. *B*, abundant callus after three months.

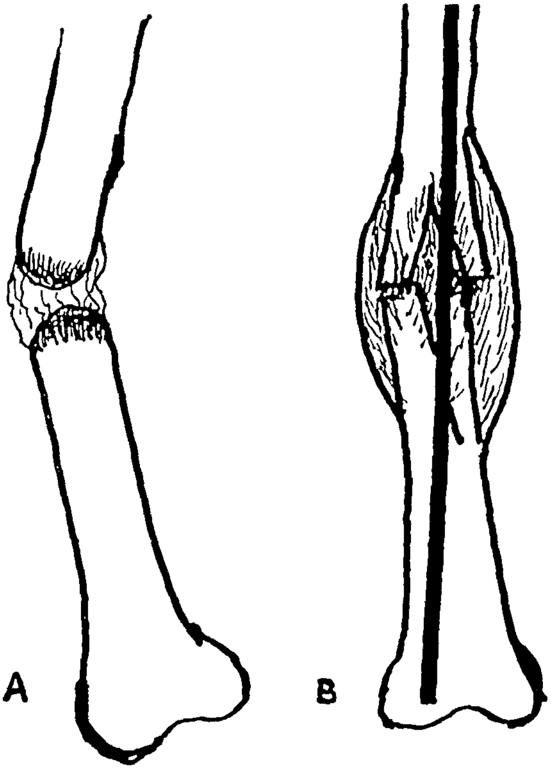

Fig. 24 (Case 25).—K. L., aged 43. *A*, nonunion and continued deformity after open reduction. *B*, result of nailing technic after three months (nail not removed).

patient walking with caliper splint worn in daytime, four months after operation.

Case 25.—Patient: K.L., aged 43. Cause of fracture: traffic accident. Date of injury: Aug. 21, 1946. Condition: open fracture. Treatment and course: *skeletal traction three weeks; open reduction without internal fixation; nonunion in three months; plaster six weeks; continued deformity; operation Jan. 27, 1947, five months after accident; reduction difficult; hip stiff owing to long immobilization and muscle shortening; ends split, scar removed; cancellous chips packed; weight bearing,* spica cast three *months; patient walking seven and* one-half months after operation; nail not removed; roentgenogram taken April 2, 1947, after three months, showed good callus. Result: some limitation of motion, but good strength; solid union.

Case 26.—Patient: *H.T.*, aged 23. Cause of fracture: fall in a mine shaft. Date of injury: Dec. 31, 1947. Condition of fracture: simple short oblique; radial paralysis on both sides. Treatment and course: nailed Dec. 31, 1947; patient walking in two months, not being able to use crutches; nail removed July 6, patient called in after six months; hospitalized three and one-half months; last roentgenogram showed abundant callus; good resolution of fracture. Result: patient returned to work July 14; good use of leg and knee; radial paralysis disappeared.

Case 27.—Patient: K.J., aged 20. Cause of fracture: mine accident. Date of injury: Oct. 1, 1947. In traction five weeks, spica cast three weeks. Condition of fracture: May 22, 1948, overriding malunion deformity; marked limitation of knee. Treatment and course: operation May 26, 1948; very difficult reduction eight months after accident;

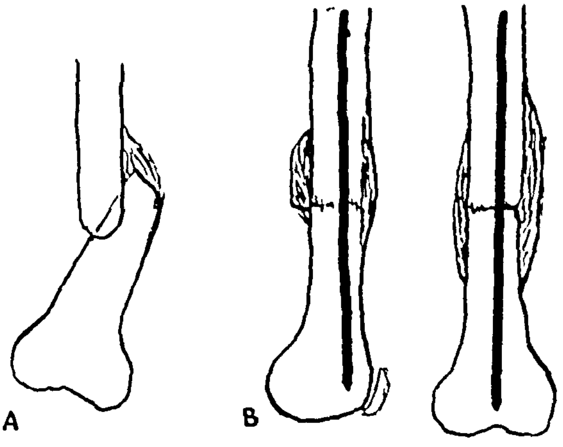

Fig. 25 (Case 29).—S. W., aged 27. *A*, overriding and instability, November 1946. *B*, good callus and apparent union three months later (in cast).

weight bearing June 15, in three weeks, knee motion limited, patient hospitalized three months, last roentgenogram revealed very little evident callus after three months, clinical stability Result patient left hospital at middle of July; about 30 degrees flexion of knee, much more than before operation

CASE 28.—Patient H R, aged 24 Cause of fracture hit while loading freight Date of injury June 24, 1948 Condition of fracture simple comminuted midthigh Treatment and course nailed June 30, 1948, delay because of shock, walking with crutches in two weeks Result roentgenograms show good position, but it is too early to evaluate

STATISTICAL SUMMARY

Number of fractures of middle third of femur, 13

Sex: male, 12, female, 1

Average age: 26, youngest 11, oldest 43

Cause of fracture.

- Occupational accidents 4
- Sports accidents 1
- Traffic accidents 3
- Falls 3
- (1 fall in mine shaft, included in occupational accidents)
- Unknown 2

Average lapse of time between accident and Kuntscher nailing, about four and one half months Fresh fractures nailed within first week, 5

Type of fracture

- Simple, 12
- Compound, 1
- Transverse, 10
- Oblique, 2

Few were comminuted

Complicating trauma One patient had bilateral transitory brachial plexus injury with rather persistent radial nerve palsy which delayed ambulation Another had severe soft tissue loss, but this did not interfere with fracture healing or convalescence

Condition of fracture when nailed

- Fresh fracture 5
- Malposition, 1
- Nonunion, 3
- Malunion, 4

After-treatment:

- Plaster of paris spica two months in 1 case (caliper splint later)
- Plaster of paris spica, three months in 4 cases
- Plaster of paris spica, six months in 1 case (this fracture was out of the cast in three months, but the nail was bent, the deformity was corrected and the patient wore a new cast three months longer)

Weight bearing in a cast was begun after a month or two in all cases except the case of brachial plexus injury There were 7 fractures for which no immobilization splint was used After a short period in traction the patients were allowed to walk with crutches within two weeks to one month Five of these had fresh fractures All showed abundant callus However, the fracture line defect was evident even after six months in most cases How long crutches were used was difficult to determine since the patients having left the hospital on crutches, often would not return until sent for

The nails were removed in 5 cases The average time the nail remained in the femur was about five months However, in none of this group were the nails inserted prior to 1947

COMMENT AND CONCLUSIONS

There is nothing significant about the fact that most of the fractures in this group had been operated on only one year previously, or less Many other operations had been performed, but those presented here were the ones available for examination and evaluation of the results

The nail seemed to give adequate stability for patients with fresh fractures who were ambulatory early On the other hand, the old deformities needed spica cast immobilization to assure against reestablishment of deformity

Three patients with fresh fractures were back at work in six months In 6 cases it was too early for final evaluation but all 6 patients appeared to have a favorable future A total of 6 patients with fractures of the middle third of the femur had returned to their former occupations

The most interesting complication occurred in Case 20 The patient, wearing a spica cast

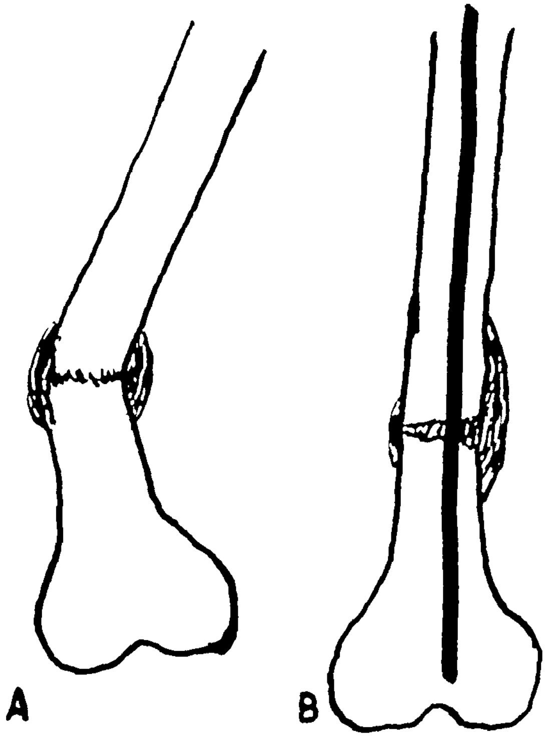

Fig. 26 (Case 30).—W. C., aged 32. *A*, healed deformity. *B*, good position after three and one-half months.

for three months after correction of malunion, showed an outward and forward bend of the nail at the site of fracture. The method used in correcting this deformity is important. The patient was placed in a spica cast and anesthetized. The cast was cut and wedged at the level of the fracture and the nail completely straightened, as was shown in a follow-up roentgenogram. Immediately thereafter the cast was removed and a new cast applied. The authors explained that, had they not changed the cast after correction, there would have been severe pressure points due to the change of position, which might have caused distressing decubitus. The patient wore this new cast for another three months, continuing weight bearing on crutches. The result was most satisfactory.

An interesting deviation of technic is evidenced in the fracture in Case 10, with nonunion distraction or sclerotic changes in the bone ends. The idea of splitting the shaft, impacting the fragments by mashing the substance together and adding bone chips gave a splendid functional result without much loss of length.

Fractures in the middle third of the femur seem ideal for this technic. Early reduction and nailing contribute to early resolution, healing and a good functional result. Reenforcement with cancellous chips about the site of the fracture seems to add a favorable influence (Dega). Even late bending deformities can be accurately corrected by wedging the cast. Early ambulation and short periods of hospitalization perhaps were factors in early return to work in some of these cases.

FRACTURES OF THE LOWER THIRD OF THE FEMUR

Case 29.—Patient: S.W., aged 27. Cause of fracture: automobile accident. Date of injury: June 26, 1946. Condition of fracture at time of nailing: simple comminuted; junction of middle and lower third; overriding nonunion; deformity. Treatment and course: nailed in November 1946, five months after accident; patient immobilized in spica cast for three months; nail not removed. Result: motion in knee and ankle reduced; patient doing clerical work, no longer a laborer.

Case 30.—Patient: W.O., aged 32. Condition of fracture at time of nailing: compound malunion deformity; healed skin. Treatment and course: osteotomy and deformity corrected, then nailed one year after accident; patient immobilized in spica for three months; weight bearing in six weeks; nail not removed. Result: apparent clinical union; patient walking without cast just two weeks after its removal.

Case 31.—Patient; aged 57. Cause of fracture; traffic accident. Condition of fracture at time of nailing: simple. Treatment and course: traction, overriding; nailed one month after accident; cancellous chips used; patient immobilized in spica cast for three months; weight bearing in one month; nail not removed. Result: patient doing heavy work six months after operation; slight limp due to stiff knee; nearly full range of motion, but some quadriceps atrophy.

Case 32.—Patient: K.T., aged 34. Cause of fracture: automobile accident. Date of injury: November 1946. Condition of fracture: compound wound healed; nonunion end-to-end deformity; complete section of sciatic nerve, soft tissue loss. Treatment and course: nailed May 4, 1947, six months after accident; immobilized in spica cast; pin bent, straightened in wedged plaster cast; patient in cast two months; weight bearing in three months; nail removed May 1948, one year later. Result: this *case illustrates the difficulties involved in* preventing preexisting deformities from recurring and the importance of having the nail well embedded deep in the thicker cancellous bone of the metaphysis, without a firm hold on the lower fragment, correction by wedging could not have been accomplished, no return of nerve repair; ankle and knee rather stiff, but this is to the patient's advantage, patient unable to work as laborer.

Case 33.—Patient: aged 28. Cause of fracture: fall. Condition of fracture at time of nailing: simple malposition at junction of middle and lower third. Treatment and course: nailed one month after accident, cancellous chips used, patient immobilized in spica cast for three months; weight bearing in one month, nail not removed. Result: good result obtained eighteen months after injury.

Case 34.—Patient: H.M., aged 35. Cause of fracture: automobile accident. Date of injury: July 1945. Condition of fracture: simple, junction of middle and lower third, overriding malunion deformity. Treatment and course: nailed Oct. 20, 1946, *fifteen months later, patient immobilized in spica cast three months, weight bearing in four* weeks; nail not removed. Result: patient now doing clerical work; seen twenty-one months after operation; good clinical union, some atrophy, 90 degree knee action; affected by weather, no recent roentgenogram available, thickening about region of fracture can be palpated.

Case 35.—*Patient K.Y. Condition at time of nailing: nonunion, overriding junction of middle* and lower third. Treatment and course: nailed nine months after accident, patient immobilized in spica cast for three months, weight bearing in six weeks, nail not removed. Result: patient now in cast; too early to evaluate.

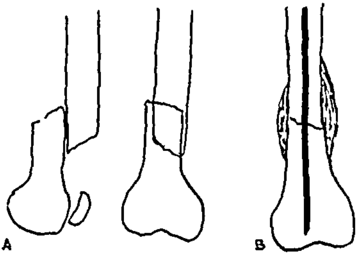

Fig 27 (Case 31).—Patient aged 37. *A*, lateral and anteroposterior views before operation. *B*, good condition on removal of cast three months later.

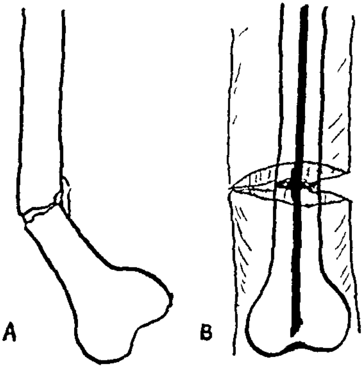

Fig 28 (Case 32).—*A*, before operation. *B*, after correction (in cast).

Case 36.—Patient G.S. The history and roentgenogram tracings have been covered in the group *of fractures of the upper third of the femur.* The fracture of the lower third, which showed a malunion, was treated with the same nail as that of the upper.

Case 37.—Patient: S.F., aged 21. Cause of fracture: hit by railroad engine. Date of injury: May 22, 1947. Condition of fracture at time of nailing: compound, middle and lower third. Treatment and course: nailed May 22, 1947, four hours after injury; patient not immobilized in cast, weight bearing on June 10, 1947, three weeks after accident; nail not removed; patient hospitalized one month and two days; roentgenograms before reduction showed overriding angulation; roentgenogram on July 20, 1947, two months later, revealed callus. Result: patient last seen in July 1948; presumably went back to work August 24, 1947.

Case 38.—Patient: B.R., aged 10. Cause of fracture: mine accident. Date of injury: April 15, 1947. Condition of fracture at time of nailing: simple, middle lower third, slight oblique. Treatment and course: nailed September 1947, no immobilization in cast; weight bearing in three weeks, nail removed July 15, 1947, three months later, patient hospitalized six weeks, roentgenogram before reduction showed deformity, roentgenogram taken in July revealed copious callus. Result: patient went back to work on July 27, less than four months after accident; good function.

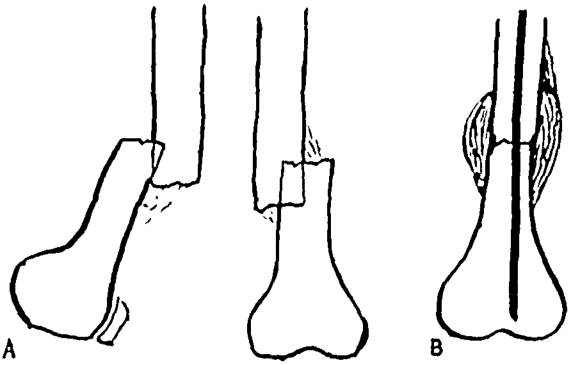

Fig. 29 (Case 33).—Patient aged 28. *A*, before operation. *B*, good callus on removal of cast three months later.

Case 39.—Patient: S.K., aged 23. Cause of fracture: mine accident. Date of injury: September 1947. Condition of fracture at time of nailing: simple fracture, middle lower third, slight oblique. Treatment and course: nailed September 1947; patient not immoblized in cast; weight bearing in three weeks, nail removed January 28, 1948, five months after accident; patient hospitalized four and one-half weeks; roentgenogram January 1948 revealed good callus but not complete resolution. Result: patient returned to work in February 1948, five months after injury; no disability now.

Case 40.—Patient: P.K., age 28. Cause of fracture: mine accident. Date of injury: Jan. 6, 1948. Condition of fracture at time of nailing: simple, junction of middle and lower thirds, oblique comminuted fragment. Treatment and course: nailed Jan. 7, 1948; patient not immobilized in cast; weight bearing in three weeks; nail removed May 28, 1948, four months after accident; patient hospitalized three weeks; roentgenogram taken June 1948 revealed good callus, almost complete resolution of fracture. Result: patient went to work June 10, five months after injury; good function now.

Case 41.—Patient: S.E., aged 25. Cause of fracture: mine accident. Date of injury: June 12, 1948. Condition of fracture at time of nailing: simple fracture, middle lower third, oblique. Treatment and course: nailed June 12, 1948; pin too small, not long enough; patient immobilized in splint three weeks to prevent rotation; weight bearing in one month, July 12; nail not removed; patient hospitalized now; roentgenograms made before reduction, in splint afterward. Result: only a little over a month has elapsed since the operation; knee bends 90 degrees; patient walks with crutches.

Case 42.—Patient: K.M., aged 34, female. Cause of fracture: mine accident. Date of injury: June 15, 1948. Condition of fracture at time of nailing: simple oblique, middle third; several flesh wounds on body; fever and shock. Treatment and course: nailed June 28, 1948; delayed because of fever and shock; patient in bed, no cast, not able to walk because of weakness, hospitalized now; nail has not been removed; roentgenograms made before reduction; after reduction revealed good relation of fragments and nail. Result: this is an early case seen three weeks after injury.

STATISTICAL SUMMARY

Number of fractures of the lower third of the femur, 14

Sex: male, 13; female, 1 (a mine laborer)

Average age: 32

Cause of fracture:

Occupational (mine) accidents	5
Traffic accidents	5
Falls	1
Unknown	2

Type of fracture:

Simple, 10
Compound, 3
Comminuted, 2
Oblique, 4

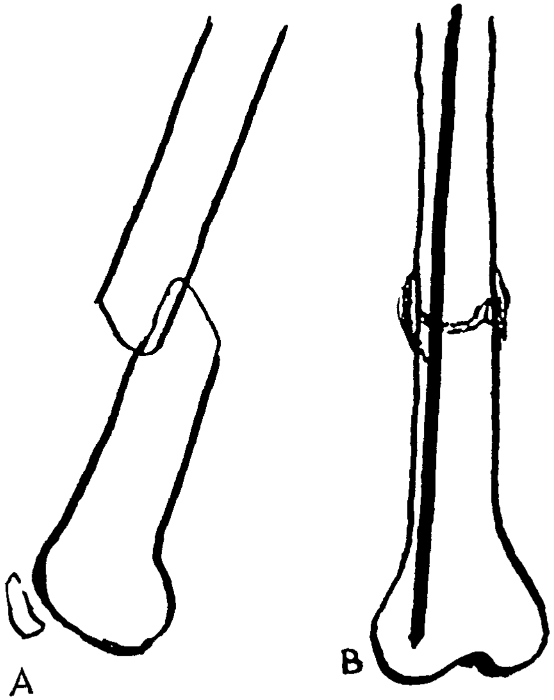

Fig. 30 (Case 34).—H. M., aged 35. *A*, deformity before operation. *B*, three and one-half months after cast was removed; little callus.

Average lapse of time between accident and Kuntscher nailing, about four and one-half months (There was a case with a delay of over twelve months)

Complications

- Numerous body wounds, severe shock 1
- Completely severed sciatic, soft tissue loss, 1
- Fracture of upper third of femur with malunion, 1

Condition when nailed

- Fresh, 6
- Old, 8
- Overriding, 2 (1 month)
- Nonunion 3
- Malunion with deformity, 2

After treatment·

All patients with fresh fractures were walking with crutches within three weeks Most remaining patients treated in plaster spica casts walked with crutches in one to three months One patient (Case 32) in spica bent nail within first month This was straightened by wedging of cast, and patient wore a new corrected spica three months longer

Removal of nail

Within three, four and five months, respectively in 3 cases of fresh fracture the nail was removed In 1 case it was removed in one year, in 2 it was retained over one and one-half years the patients being unwilling to consider removal

Roentgen results

Fresh fractures show early copious callus

Most roentgenograms available on old nonunions and malunions show fracture in cast but with callus formation Recent roentgenograms often not available, since films were scarce and clinical need for roentgen study not indicated

Functional results

Fresh fractures

1 patient at work in railroad yards after

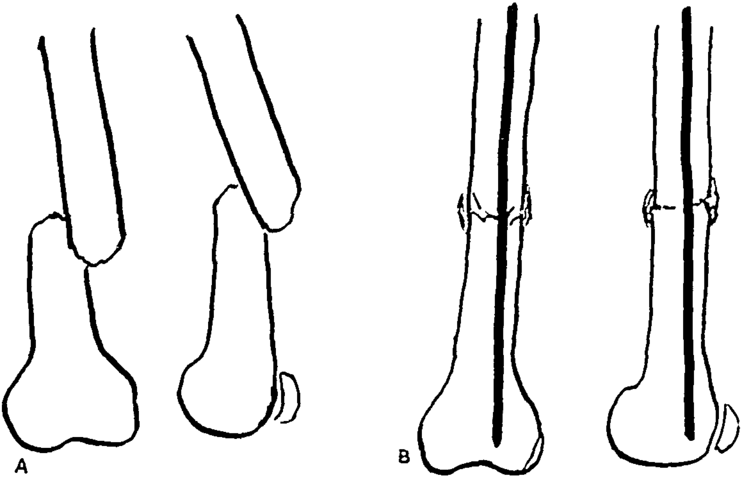

Fig 11 (Case [illegible]) —A [illegible] deformity before operation B, good position after three months

four months.
1 patient at work in mine after four months.
2 patients at work in mine after five months.
Old fractures
2 patients limited to clerical work because of limitation of knee and ankle motion.
2 patients too recently treated to evaluate condition, but appear to be progressing favorably.
2 patients seen over one year after nailing; excellent functional results.
1 patient has been discussed under fractures of upper third of femur.

COMMENT AND CONCLUSIONS

All of these fractures were located about the junction of the middle and lower third of the femur. They were either transverse or mildly oblique. The functional results of the fresh fractures were extraordinarily striking. One patient was back at work in the railroad yards in four months; another returned to work in the mines in less than four months; two others were at their mine occupations within five months. Patients with fresh fractures without immobilization or bracing were started on early ambulation and weight bearing and seemed to respond to the bone regenerative process and fracture healing more rapidly than did those whose fractures were nailed late. On the other hand, it must be remembered that in the cases of malunion and nonunion there was a long-standing deformity and a considerable amount of chronic functional disability before the fracture was finally reduced and properly immobilized with the nail. Two fractures which, after a month of unsuccessful treatment, were reduced, nailed, and had cancellous bone chips packed about them, responded much as did fresh fractures, showing complete restoration of function.

Prompt reduction and nailing seems to contribute to unusually early resolution of callus and good functional results. Cancellous bone chips add a favorable influence. All clinics represented recognize the fact that it is essential that the distal end of the nail go well down into the firm cancellous bone of the lower metaphysis to obtain adequate stability, particularly in fractures of the lower third. There is a unified opinion in Poland that this procedure should be limited to transverse and mildly oblique fractures at about the junction of the middle and lower thirds of the femur (at least 4 inches (10 cm.) above the knee joint) and not below that point. Long oblique or severely comminuted fractures in this region and supracondylar fractures can seldom be sufficiently stabilized with the Küntscher nail.

For fresh fractures early ambulation and weight bearing with crutches until clinical healing takes place is generally accepted. When there is long-standing deformity prior to nailing, plaster spica cast immobilization is essential for at least three months. However, even in the cast, the patient is encouraged to become ambulatory.

All authorities stress the importance of walking and weight bearing in the case of a stiff knee, thereby using the muscles of the thigh to give splinting and stability to the fracture. Knee bending while walking is not allowed until stiff-leg weight bearing has been carried out for two or more months, or until there is positive evidence of adequate union. However, when the patient is in bed, he is encouraged to bend his knee actively after the second week following operation.

PATHOLOGIC FRACTURES OF THE FEMUR

CASE 43.—Patient A., aged 26, had osteogenesis imperfecta, previous fractures having left her with a pseudo-arthrosis of the right femur in the middle third. She came to the clinic after a fall to the floor, resulting in a fracture of the upper third of the left femur. Both femurs were nailed, and cancellous bone chips were packed about the fractures. The patient was in a double spica cast for three months, after which time roentgenograms showed good callus and a good healing process. Active motion and ambulation were encouraged. At the time of her operation there was marked limitation of motion of the right knee because of the old disability and deformity due to the pseudo-arthrosis.

Six months after the operation right knee motion was limited to about 10 degrees of flexion, but the left knee had nearly 10-degree flexion. The patient was still walking with crutches, but she has good clinical union and the nails certainly gave stability to the femur.

CASE 44.—Patient B., aged about 30, had severe outward bowing of the upper portion of both femurs due to osteofibrosa cystica (von Recklinghausen's disease) of thirteen years' duration A fracture occurred at the junction of the middle and lower third of the right femur The operation consisted of osteotomy of the femur at the point of greatest deformity, alignment of the lower fragments and threading the nail into the fragments Cancellous bone chips were packed about the fractures, and a spica cast was applied for three months The patient became ambulatory with crutches in one month

When examined eight months after the operation, the patient had a good straight-appearing femur and clinical union, with splendid knee and extremity function He then wished to have osteotomies performed on the opposite deformed femur in order that both legs might be straight

COMMENT AND CONCLUSIONS

Two cases with only three pathologic fractures in which good results were obtained by intramedullary nailing are indeed inconclusive However, the possibilities of the usefulness of this technic in giving stability while healing is taking place should not be overlooked

SUMMARY

The author discusses treatment of fracture of the femoral shaft by the Kuntscher nailing technic, with outline reports of cases Emphasis is laid on the supreme importance of thorough knowledge and skill in the management of fractures by this method

RÉSUMÉ

L'auteur discute le traitement des fractures du fémur à l'aide de la technique de Kuntscher et donne un résumé de 140 cas observés en Pologne Ces cas se classifient en quatre catégories

(a) Fractures du tiers supérieur du fémur
(b) Fractures du tiers moyen du fémur
(c) Fractures du tiers inférieur du fémur
(d) Fractures pathologiques du fémur

L'auteur recommande la réduction prompte et le clouage de ces fractures Ainsi on obtient les meilleurs résultats

RIASSUNTO

L'A. discute la cura delle fratture femorali con la tecnica di Kuntscher, da lui adottata in oltre 40 casi curati in Polonia Le fratture vengono suddivise in 4 categorie a) fratture del terzo superiore del femore b) fratture del terzo medio c) fratture del terzo inferiore d) fratture patologiche I migliori risultati vengono ottenuti con una pronta riduzione e fissazione mediante chiodi

RESUMEN

El autor estudia el tratamiento de la fractura femoral por la tecnica del clavo de Kuntscher, resumiendo mas de 40 casos observados en Polonia Su comunicación comprende 4 grupos (a) fracturas del tercio superior del fémur, (b) fracturas del tercio medio (c) fracturas del tercio inferior, y (d) fracturas patológicas El autor señala que para obtener los mejores resultados es necesaria la rapida reducción e inserción del clavo

ZUSAMMENFASSUNG

Der Verfasser eroertert die Behandlung von Oberschenkelbruechen mit der Kuentscherschen Nagelung und gibt eine Zusammenfassung von mehr als vierzig Faellen, die in Polen beobachtet wurden Seine Darstellung zerfaellt in vier Abteilungen

a Brueche des oberen Drittels des Oberschenkels
b Brueche des mittleren Drittels
c Brueche des unteren Drittels
d Pathologische Brueche

Es wird betont, dass unverzuegliche Einrichtung und Nagelung zur Erzielung bester Ergebnisse von Wichtigkeit sei

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Author's Note My introduction to the Kuntscher technic dates from 1946 when I was a member of a Medical Teaching Mission (UNRRA—USC) to Czechoslovakia where I observed many fractures treated by this method There I procured some nails and equipment for use at home While a member of the Mission to Poland (WHO—USC) my interest was quickened and resulted in this study My personal experience in a modest number of such fractures seems to justify this method as an excellent measure for those properly equipped by experience in bone surgery and for those having the necessary equipment. Going beyond the limits of this method or attempting it without all the necessary apparatus may prove disastrous

I am deeply indebted to my friends Professor Gruca, Professor Dega and Dr Nowinski for the privilege of studying these fractures in their clinics and for the copies of roentgenograms they so kindly furnished

Management of Urinary Incontinence in Women

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THE close embryologic and anatomic relation between the female generative and urinary organs has prompted us for many years to study malfunctions of the urinary bladder as combined gynecologic and urologic procedures. The following discourse is our gynecologic version of the prophylactic and active management of three common causes of partial and total incontinence of urine.

The three conditions to be discussed are incontinence (1) following childbearing, (2) subsequent to either supracervical or total hysterectomy, and (3) resulting from a vesicovaginal fistula.

1. *Incontinence Following Childbearing.*—When the patient presents herself, a careful consideration of her history will usually establish or rule out such extragynecologic factors as orthopedic, neurologic, hematologic or traumatic conditions.

The taking of the history is followed by a complete physical examination to determine the status of all systems, and this is followed by confirmatory laboratory procedures. Roentgen study may occasionally reveal an unsuspected occult spina bifida.

After concluding from the history, physical examination, and laboratory data that the stress leakage of urine is not due to extraneous causes, we proceed with a urologic study to determine the extracystic and intracystic and the extraurethral and intraurethral status.

The usual cause of incontinence in the so-called "true operative cases" is childbearing.

Applied Anatomy.—(*A*) Intrinsic Bladder Musculature: The muscularis of the bladder consists of unstriped fibers arranged in three layers; namely, an external longitudinal, a middle circular, and an internal longitudinal coat. The middle circular layer is of the utmost importance, owing to the fact that its fibers converge toward the urethrovesical junction, the so-called vesical neck, and surround it in collar-like fashion, thereby creating a strong involuntary muscular ring which is known as the internal urethral sphincter.

The internal urethral sphincter, then, plays a highly important role in the continence of urine, and it is this muscular ring which is isolated and plicated in the Kelly plastic procedure for the correction of stress incontinence. However, since it is only one of the several sphincteric factors in the control of urinary flow, we feel that in some cases its repair alone may not suffice in the correction of impaired control.

(*B*) Intrinsic Musculature of the Urethra and the Sphincter Urethrae Muscle: The muscular coat of the urethra is composed of two layers of smooth fibers, an inner longitudinal and an outer circular layer.

This coat might be said to possess a centrifugal action, in that it contracts with equal force from all points on the periphery toward the center of the urethral lumen. The sphincter urethrae muscle lies within the layers of the urogenital diaphragm.

(*C*) Uteropubic Fascia: A structure frequently referred to in the gynecologic literature is the so-called uteropubic fascia or pubocervical muscle.

The downward prolongations of the pubocervical tissue find their way between the base of the bladder and the anterior vaginal wall. By properly plicating the tissue, a portion of the platform upon which the bladder rests is made taut, and the fundus vesicae is therefore elevated on its transverse and longitudinal axes.

(*D*) Pelvic Floor: By contraction of the levator ani muscle the pelvic floor is raised in its entirety, the anal canal is drawn upward

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toward the pubes, a strong sphincteric action on the vagina manifests itself and the bed or platform upon which the bladder and the first part of the urethra rest are elevated

(E) Bulbocavernosus Muscle The bulbocavernosus muscle, or sphincter vaginae consists of two halves, one on either side of the vestibule It is of the voluntary variety and is situated in the superficial perineal compartment, covered by Colles fascia and resting on the inferior fascia of the urogenital diaphragm

In operation for the cure of incontinence a proper anatomic repair should include suturing of the stretched or lacerated bulbo avernosus fibers that are observed periure hrally

Preoperative Management —In addition to le usual regime employed in preparation for l vaginal operative procedures we lay par ucular stress upon the condition of the urine and the bladder Since many patients with "true operative incontinence" have an associated low grade vesical infection and some of them have had repeated attacks of acute cystitis, we make routine cultures of the urine If necessary, indicated antibiotics are given preoperatively

Surgical Technic —A light weight piece of metal tubing of No 16 F caliber is placed in the bladder It will be noted that in the "true operative cases" the vast majority of which present a combined urethrocele and cystocele this tubing will often approximate an angle of 90 degrees with the horizontal upon insertion Our aim is to restore the normal 45 degree angle

In the infrequent cases in which the urethrocele is unaccompanied by a cystocele it is advantageous to start the initial incision over the bladder for two reasons first, because no plane of cleavage exists between the anterior vaginal wall and the urethra while a plane is present between the anterior wall and the bladder, and second mobilization of the bladder with subsequent advancement and plication of the pubocervical tissue plane helps in our opinion to rebuild the damaged urethrovesical platform irrespective of the presence of a clinically detectable cystocele

A sharp scissors dissection is used in mobilization of the bladder We make a point of leaving as much of the pubocervical tissue as possible attached to the bladder and keeping the vaginal wall devoid of it, as the excess of the latter will subsequently be discarded Further, this maneuver acts as a prophylactic measure in protecting the bladder wall from injury during the suturing to follow

We next plicate the pubocervical tissue in the midline, beginning near the cervix and extending upward to the urethrovesical junction, employing interrupted fine silk sutures The number of rows of sutures employed depends upon the size of the cystocele, but we place at least one row even though no vesical relaxation is apparent We then place reinforcing sutures so that the catheter is made to assume a 45 degree angle with the horizontal

The next step is the placing of fine interrupted silk sutures from the external meatus down to the vesical neck This is accomplished with the catheter still in situ Upon completion of this suturing the diameter of the urethra will approximate 16 F, with its normal circular contour restored By this maneuver the urethral sphincter fibers of the bulbocavernosus the sphincter urethrae muscle which lies within the layers of the urogenital diaphragm, the urethral sphincter fibers of the levator ani, and the involuntary internal urethral sphincter are successively plicated and shortened In addition, the urethra, which during micturition normally should approach a No 14 F caliber, is approximated to a No 16 F caliber, so that a No 2 F compensation exists for the contraction of scar tissue subsequent to the repair

The redundant portion of the anterior vaginal wall is then excised and the residual portion brought together with silk This creates a firmer floor for the vaginal portion of the urethra

The catheter is then removed, and a Foley bag inserted into the bladder

The performance of a routine perineorrhaphy is the final step in the operation By taking up the slack in the pubococcygeal bellies of the levatores and their overlying fascia, one elevates and makes taut the supporting foundation upon which the bladder and the urethral suspending structures rest Indirectly therefore, the slack is taken up pubocervical tissues, the tendinous arches, the pubovesical ligaments and the neurovascular bundles, and as a consequence the bladder and urethra are more firmly slung and suspended in the pelvis. Further, an indirect tightening effect manifests itself on the previously repaired urethral sphincter fibers derived from the levatores.

Postoperative Management.—In addition to the usual postoperative treatment, daily or twice daily irrigations of the bladder through the Foley bag are carried out. Antibiotics are used as indicated. The Foley bag is left in situ for three or four days, and after its removal the patient is allowed out of bed. She is usually discharged on the tenth postoperative day.

An exceedingly important point in late postoperative care is to impress upon the patient the need of returning about three weeks after the operation. At this time the urethra is dilated. This is done in order to alleviate vesical spasms and minimize cicatrization about the urethra.

2. *Incontinence Subsequent to Supracervical or Total Hysterectomy.*—Clinical studies have shown the importance of trigonal contraction in releasing the closure of the bladder by pulling the neck through straightening of its tangential axis. This has been confirmed by anatomists and clinicians. Others have observed striated muscle fibers in the trigone, which further substantiates the probability of contraction of the trigone. Experimentally it has been shown that the pull of the ligamentum and the musculus pubovesicalis has an opening effect on the vesical neck.

In our opinion a probable cause of incontinence is to be found in the improper technic of reflection of the vesical peritoneum and its fixation with abnormal trigonal contraction.

In the early steps of a hysterectomy, when the vesical peritoneum is to be reflected, it is frequently cut too low on the uterus, thereby leaving too little for proper and free peritonealization of the vagina or the cervical stump. The surgeon, in his zealous efforts to peritonize, will occasionally bring the peritoneum and the bladder well over the posterior aspect of the stump. The result is that the bladder is occasionally put under undue tension; this causes rigidity of its neck and floor and thereby produces an anatomic distortion of the delicate mechanism of muscle and nerve control of the urinary apparatus.

Because of the aforementioned anatomic disturbances of the urinary bladder that may follow hysterectomy, we regard reflection of the peritoneum as an important prophylactic procedure against urinary disturbances. We suggest that the peritoneum be cut as high as possible on the uterus, thus yielding a large, free anterior flap. The posterior peritoneum is dissected away from the lower corporocervical junction. In this way the anterior and posterior peritoneal flaps are sewed together without any undue pulling or distortion of the urinary bladder. We do not suggest the use of a purse-string or a punch suture, as it may cause puckering and anatomic distortion of the bladder. Furthermore, we suggest sewing the uterosacral ligaments transversely, which indirectly will release any pull on the bladder anteriorly. Interrupted black silk sutures are used throughout.

3. *Incontinence Due to Vesicovaginal Fistula.*—In our gynecologic outpatient clinic at the Cook County Hospital we have been fortunate in observing and studying a large number of these cases. We appreciate both the serious personal problem that confronts the patient, varying from simple discomfort to complete social isolation, and our own surgical problem.

These patients are initially hospitalized for a complete physical checkup to rule out such conditions as syphilis, diabetes, tuberculosis, nephritis, anemia and blood dyscrasia, which might in themselves, if not detected preoperatively, be factors in producing an immediate or delayed postoperative nonclosure. The patient is then examined cystoscopically, and a study is made of the fistula from the vesical aspect, with particular observation of its relation to the trigone and the interureteral ridge, and the type and extent of inflammatory reaction around the fistulous opening. We have noted that the degree of reaction diminishes and the tissues are "set," or fibrosis is at a maximum, about three months after formation of the fistula, and operation to close same can as a rule be attempted at any time after that date. At this time we also determine whether it will be necessary, because of the proximity of either ureteral orifice to the fistula, to place a catheter in the ureter during the operation

Next, the cystoscopist inserts a ureteral catheter into the bladder and then, as we term it, "strings up the fistula" by passing this catheter through the fistulous opening into the vagina Occasionally a retrograde approach is necessary A speculum is then placed in the vagina The fistula, especially if inaccessible, is more easily studied in relation to the cervix, or superior aspect of the vault of the vagina, if the patient has undergone a total hysterectomy

After the use of this combined intravesical and intravaginal study, particularly the relation of the fistula to such definite landmarks as the two ureteral openings, the interureteric ridge or (with simpler fistulas) the urethra, we organize our combined plan of attack

In the event that all systemic abnormalities are ruled out, the patient is permitted to return to her home and instructed to reenter the hospital in two weeks for operation Lactic acid douches are taken to maintain the normal vaginal hydrogen ion concentration, which is an additional factor in healing The patient is hospitalized four days before the operative procedure Cultures are made of the urine and indicated antibiotics given preoperatively

We feel that spinal anesthesia is to be preferred for these operations because of the marked relaxation, and therefore we use it unless there is a contraindication The fistula is then again "strung up" If the fistula is in close proximity to either ureteral orifice, an additional catheter is passed into the ureter at this time to prevent the ever possible catastrophe of including this orifice in a suture

We then begin mobilization of the bladder by making an initial vaginal incision in that portion of the vagina which still maintains its normal relation to the uteropubic fascial plane and the underlying bladder We prefer a long anteroposterior incision starting a few centimeters below the urethral orifice and extending down to the fistula, then around and then beyond it Complete mobilization of the bladder is imperative The bladder with the maximum amount of uteropubic fascia attached to it, is separated from the vagina

It seems that the snug catheter in the fistulous opening, owing to its easy maneuverability, is a distinct aid in sharp dissection around the often inaccessible fistula The operating surgeon, by manipulating the catheter, greatly increases the accessibility of the fistula By employment of the catheter we minimize the use of instruments in an often restricted operating area

Having mobilized the fistula, we then proceed with the repair We have been using a fine catgut purse string suture This is placed just outside of and around the catheter into the tissue of the bladder wall The catheter serves just the same purpose as the appendix when a purse string is placed in the serosa of the cecum, and by manipulating the catheter we have a minimum amount of difficulty in placing our suture Then, as we are ready to tie, the assistant withdraws the "strung-up catheter" from the bladder via the urethra The edges of the fistula are thereby inverted into the lumen of the bladder

Since the bladder has been freely mobilized, it is our practice to place additional rows of Lembert sutures in crisscross fashion over the originally inverted area to reinforce the site of repair The vaginal wall is then closed with interrupted silk sutures

For the larger fistulas we do not use the purse string, but rather place Lembert sutures into the wall of the mobilized bladder and withdraw the catheter through the urethra as we tie

A Foley bag is then inserted into the bladder

Postoperatively we are still using the Bradford frame The patient lies on her abdomen for seven or eight days, but is permitted to turn to an angle of 35 degrees on either side Her legs and arms are exercised each day to prevent venous stasis On the fifth day she is turned over on her back for a short time and is given an enema if necessary We believe that this prone position is important, as it helps to divert the urine from the healing surgical wound area

The catheter is irrigated only if there is an obstruction to the urinary flow or if the urine becomes turbid

The important postoperative therapy is the giving of antibiotics, depending on the results of cultures.

The catheter is removed about seven or eight days after the operation, and the patient may go home any time thereafter, with instructions not to permit the bladder to become distended and to attempt to urinate every two or three hours when awake. She is told emphatically to abstain from intercourse for four months.

SUMMARY AND CONCLUSIONS

1. The management of incontinence following childbearing should include a careful systemic inventory, urine culture with administration of antibiotics, and restoration of the urethrovesical platform, with utilization of (*a*) the intrinsic bladder musculature; (*b*) the intrinsic musculature of the urethra and the sphincter urethrae muscle; (*c*) the uteropubic fascia; (*d*) the bulbocavernosus muscle, and (*e*) the pelvic floor.
2. Utilization of the maximum amount of reflection of the vesical peritoneum and transverse suturing of the uterosacral ligaments during hysterectomy has minimized vesical symptoms following this procedure.
3. The improved results of vesicovaginal fistula repair seem to be due to (*a*) more careful preoperative study; (*b*) antibiotics; (*c*) wider mobilization of the bladder, and (*d*) the use of spinal anesthesia.
4. Many women with urinary incontinence initially appear in the gynecologic clinic, or in private practice come under the attention of the gynecologist. It has been our policy to consult and coordinate the judgment and assistance of our fellow urologists in the solution of these problems.

RÉSUMÉ

L'incontinence urinaire après l'accouchement demande un examen soigné et une analyse et une culture de l'urine. On aura recours à l'injection d'antibïotiques et à la restauration de la plateforme urethrovésicale par l'utilisation de:

1. La musculature intrinsèque de la vessie. 2)—de la musculature intrinsèque de l'urèthre et du sphincter de l'urèthre. 3)—du fascia utéropubique. 4)—du muscle bulbocaverneux. 5)—du plancher pelvien.

2. L'utilisation du repli vésical péritonol et de la suture transverse des ligaments utérosacraux dans l'hysterectomie, diminuent les symptômes vésicaux conséeutifs à cette opération.

3. Les meilleurs résultats obtenus dans les opérations pour les fistules sont dûs à une étude pré-operatoire plus soignée, à l'emploi d'antibïotiques, à une mobilisation plus grande de la vessie urinaire et à l'emploi de l'anesthésie spinale.

4. Beaucoup de femmes avec incontinence urinaire viennent aux cliniques gynécologiques ou à leurs médecins pour un traitement gynécologique. Nous avons coordonné notre jugement à l'aide d'urologistes pour la solution de ces problèmes.

RIASSUNTO

1. La cura delle incontinenze vescicali postpartum dovrebbe includere un esame generale molto accurato, culture delle urine con somministrazione di antibiotici, ripristino delle condizioni anatomiche del piano uretro vescicale, utilizzando: a) la muscolatura intrinseca della vescica b) muscolatura intrinseca dell'uretra e dello sfintere uretrale, c) la fascia utero pubica, d) il muscolo bulbocavernoso, e) il pavimento pelvico.
2. I disturbi vescicali successivi all'isterectomia sono stati notevolmente ridotti utilizzando al massimo la plica vescicale del peritoneo e suturando transversalmente i legamenti utero-sacrali.
3. Il miglioramento dei risultati delle operazioni per fistole vescico-vaginali sembra dovuto a) ad un piu' accurato esame preoperatorio b) alla somministrazione di antibiotici c) ad una piu' ampia mobilizzazione della vescica d) all'uso piu' frequente dell'anestesia spinale.
4. La diagnosi e la cura delle incontinenze vescicali vanno coordinate fra l'urologo ed il ginecologo. Questa cooperazione migliora indubbiamente i risultati.

RESUMEN Y CONCLUSIONES

1. El tratamiento de la incontinencia de orina a continuación del embarazo debe incluir un minucioso examen orgánico general, cultivos de la orina junto con la administración de antibióticos y restauración de la plataforma

uretrovesical utilizando a) la musculatura intrínseca de la vegiga, b) la musculatura intrínseca de la uretra, c) la fascia uteropúbica, d) el musculo bulbocavernoso, y e) el suelo pélvico

2 El aprovechamiento de la maxima extensión posible del peritoneo vesical reflejo y la sutura transversal de los ligamentos útero sacros durante la histerectomía ha reducido al mínimo los síntomas vesicales a continuación de esta intervención

3 Los resultados excelentes de la reparación de la fístula vesicovaginal se deben al parecer a a) un estudio preoperatorio mas cuidadoso, b) el uso de antibióticos, c) una movilización mas amplia de la vegiga, y d) al uso de la anestesia raquídea

4 Muchas mujeres con incontinencia de orina son observadas en principio en la clinica ginecológica, o al despacho particular del médico El autor ha tratado siempre de solicitar la opinión y colaboración del urólogo para solucionar estos problemas

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1 Die Behandlung der Harninkontinenz nach Schwangerschaft sollte eine sorgfaeltige Untersuchung des Harnsystems, ferner Urinkulturen unter Anwendung von Antibiotika und die Wiederherstellung der Harnleiterblasenplatte einschliessen Bei dem letzteren Vorgang sollten die folgenden Gebilde benuetzt werden

a) Die innere Blasenmuskulatur,
b) die innere Harnleitermuskulatur und der Harnleiterschliessmuskel,
c) die Fascia uteropubica,
d) der Musculus bulbocavernosus,
e) der Beckenboden

2 Die Anwendung eines moeglichst ausgiebigen Umschlags des Blasenbauchfells und einer Quernacht der uterosakralen Ligamente bie der Hysterektomie hat die der Operation folgenden Blasensymptome herabgesetzt

3 Die besseren Ergebnisse in der Wiederherstellung von Blasenscheidenfisteln scheinen bedingt zu sein, durch

a) sorgfaeltigere Untersuchung des Kranken vor der Operation,
b) Anwendung von Antibiotika,
c) ausgedehntere Mobilisierung der Blase,
d) Anwendung der Spinalanesthesie

4 Viele Frauen mit Harninkontinenz suchen zuerst eine Frauenklinik oder die Privatsprechstunde eines Gynaekologen auf Es ist unsere Gepflogenheit derartige Probleme in enger Zusammenarbeit mit unseren Kollegen aus dem urologischen Fachgebiet zu loesen

Unless we are careful, we shall conventionalize knowledge, our scientific systems will suppress all understanding of the ways of the Universe which fall outside their abstractions our modes of testing ability will exclude all the youth whose ways of thought lie outside our conventions of learning —Whitehead

Prevention of Some Post-Gastrectomy Difficulties by New Gastrectomy Technic

(Pantaloon Anastomosis)

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My last gastroenterostomy was performed in 1925. Since 1924 I have performed 480 gastrectomies by the conventional Finsterer-Hofmeister technic for primary and secondary ulcers and 86 gastrectomies for ulcers and carcinoma by the new technic. The known incidence of jejunal ulcer in 480 gastrectomies by the conventional technic was 1 per cent. It is, however, unlikely that this number represents the true incidence of postoperative jejunal ulcer. Thus far there is no evidence that jejunal ulcers developed in any of the patients operated on by the new technic. The mortality in 566 consecutive and unselected gastrectomies by the established technic and by the new technic was 1.4 per cent.

An indefinite number of gastrectomized patients complain of trivial symptoms and disabilities, which usually disappear in time. Other symptoms are quite annoying and disabling. The most common complaints are directed against intolerance to milk and sweets. Weakness, fatigue, dizziness and a fleeting feeling of faintness are not infrequent Loose and frequent bowel movements may alternate with constipation.

Although no definite cause has been advanced for some of the post-gastrectomy symptoms, others appear to have a plausible explanation in the specific alteration of structure and function brought about by the gastrectomy. Annoying symptoms and disabilities following the gastrectomy operation may be related (1) to overdistention, because of the small capacity of the gastric pouch; (2) to precipitate emptying of undigested and unprepared food into the jejunum (dumping syndrome); (3) to faulty methods of anastomosis, or (4) to gastritis from reflux of bile and pancreatic juice into the gastric pouch. This presentation is chiefly limited to the reflux of enteric contents into the gastric pouch.

In a paper published in 1940 in *Surgery, Gynecology and Obstetrics* I expressed the opinion that the presence of bile and pancreatic juice in the stomach may be the cause of gastritis and of some of the dyspeptic symptoms not infrequently encountered after gastrectomy. Pancreatic juice is always present with bile and is much more irritating to the mucosa of the stomach than is bile alone. In the new gastrectomy operation a jejunal pouch is formed by anastomosis of two jejunal loops. This pouch, which is joined to the gastric remnant, prevents regurgitation of bile and pancreatic juice into the gastric lumen. The newly created jejunal pouch may also serve as a substitute for the partial loss of storage space in the gastric remnant.

Schindler's clinical and gastroscopic studies on the postoperative stomach have been extremely discouraging. He reports a great number of patients who are not relieved of pain by surgical treatment and who do not return to the surgeon who performed the operation but consult others Schindler reports: "In some hospitals there are a really terrifying number of such patients observed who after gastric surgery had become permanently incapacitated." The observation was made that their distress was almost intractable. Schindler was the first to describe the frequency of severe gastritis in the postoperative stomach. He expressed agreement with others that the gravity, the extent and the various forms of gastritis in the postoperative stomach impressively exceeds all other pictures of inflammation (Gutzeit and Teitge).

"From the grandiosity of these changes alone and without knowledge of the case history and of the clinical findings it is possible

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to recognize the postoperative stomach." Schindler concludes thus: "The unregulated reflux of intestinal juice through a patent stoma is the chief reason for the origin of the chronic inflammation of the postoperative stomach, and that operations which do *not* prevent this reflux cannot be considered as proper treatment for an essentially benign disease such as peptic ulcer." Again, quoting from Schindler: "There is a saddening unanimity of opinion that treatment of the gastritis of the postoperative stomach is one of the most hopeless tasks. The symptoms of postoperative gastritis are characterized by torturing continuity and intractability."

My own results with the conventional gastrectomy over a period of twenty-five years are at variance with the results reported by Schindler. This may be explained by the technic of the Finsterer-Hofmeister operation, which I have used in all my gastrectomies until lately. It is likely that in the Finsterer-Hofmeister gastrectomy the reflux of enteric contents into the gastric pouch is limited to a variable and unpredictable degree by the inverted flap of tissue at the lesser curvature and by the direction of the gastrojejunal stoma. There are, however certain types of gastrectomy operations that invite a great deal of regurgitation of bile and pancreatic juice into the stomach. A B Watson, who recently reviewed the end results of 122 gastrectomies, reported the cases of 12 patients who vomited bile.

Cure of the original ulcer and prevention of jejunal ulcer are considered in part to depend on the regurgitation of bile and the alkaline pancreatic juice into the stomach. Boldyreff expressed the opinion that regurgitation of bile and pancreatic juice into the stomach is a normal process that serves to regulate and maintain gastric acidity at a constant level. Authi Kesavalu and Frank Mann, however, concluded that the presence of the entire duodenal contents in the stomach does not cause effective neutralization, buffering and dilution of gastric acidity in either the fasting or the digesting state. "It is questionable if the slight and infrequent duodenal regurgitation that occurs normally can be a primary and essential factor in controlling intragastric acidity" (Kesavalu and Mann). Schmilinsky

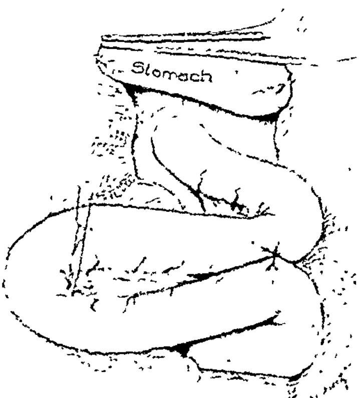


Fig 1—Jejunal loops approximated by interrupted silk sutures.

conceived the idea of forming an "inside apothecary" by anastomosis of the proximal jejunal loop into the stomach, thus diverting all of the duodenal secretions into the stomach. The Schmilinsky procedure increased the incidence of jejunal [illegible] experimentally and [illegible] rostomy proved equal. [illegible]. All the operations that introduce alkaline duodenal contents into the stomach produce irritation, gastritis, anorexia, nausea and vomiting.

In 1933 and again in 1934 I published studies on the role of spasm in the etiology of peptic ulcers. In some of these studies a large jejunal lumen was created by anastomosis of two parallel segments in an antiperistaltic direction. A large jejunal lumen created by this procedure counteracted any obstruction produced by spasm of the jejunum at the site of the gastrojejunoanastomosis. I applied this operation for the first time on a patient with a chronic duodenal ulcer in 1943. This operation was performed because the lumen of the jejunum was extremely narrow and its walls were spastic. I was apprehensive that such an unusually narrow lumen would result in difficulties with emptying. Recalling my experiments (reported in [illegible], with the d[illegible]

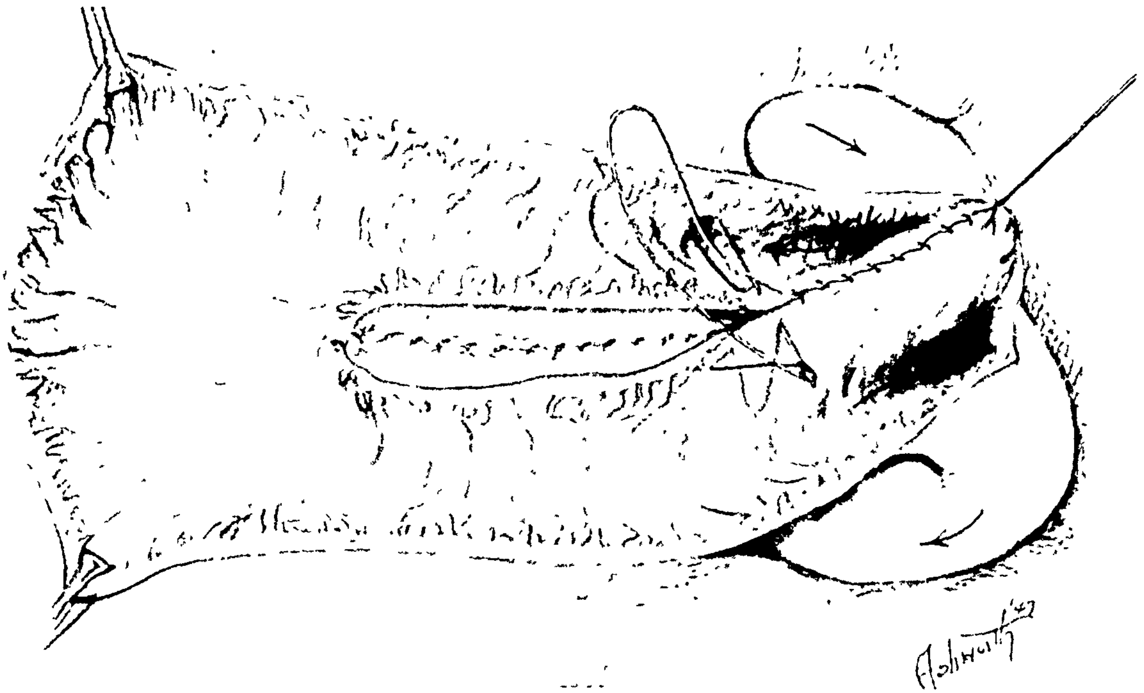


Fig. 2.—Beginning of second row of through-and-through continuous hemostatic sutures for posterior wall.

barreled anastomosis, which resulted in no emptying difficulties of this kind, I established gastrojejunal continuity in this patient by the method mentioned. The patient made an uneventful recovery and has remained in good health since. It was not until 1946 that I recognized other advantages of this operation, particularly its ability to prevent reflux of the highly irritating enteric contents into the gastric remnant.

The technic of the operation is depicted in the illustrations.

The appearance of the complete anastomosis, with the flaring of the afferent and efferent bowel loops from the crotch of the newly created sacculation, resembles that of a pair of pantaloons. The pantaloon type of anastomosis functions as an enteroenteroanastomosis and in addition provides more assurance for a free passage at the gastrojejunal stoma than does the conventional single-lumen gastrojejunal anastomosis. The new operation embodies the enteroenteroanastomosis of Braun and a gastroenteroanastomosis in a single maneuver, without a break in continuity. This type of gastrectomy is of particular advantage in difficult situations with poor accessibility and in the presence of inflammation. Excessive suturing and overlapping is permissible at the gastrojejunal border, since it does not endanger free passage at the stoma. This technic is adaptable for gastric ulcers near the cardia, for carcinoma when only a small fragment of gastric tissue is left, or for total removal of the stomach.

My experience with this operation includes 84 partial gastrectomies for ulcer and carcinoma and 2 total gastrectomies for carcinoma. There have been no deaths. Most of the patients have been seen on several occasions and frequently interrogated. I gain the impression that such minor complaints as intolerance to milk and sweets and the inability to take large meals do not differ much from those encountered after the established operation. Thus far none of the patients treated by pantaloon gastrectomy have displayed any of the grave symptoms or disabilities characteristic of the dumping syndrome or jejunal shock. The most significant results were obtained, however, in 5 patients who were operated on by the new type of anastomosis after the development of grave and intractable disabilities which followed the established method of operation

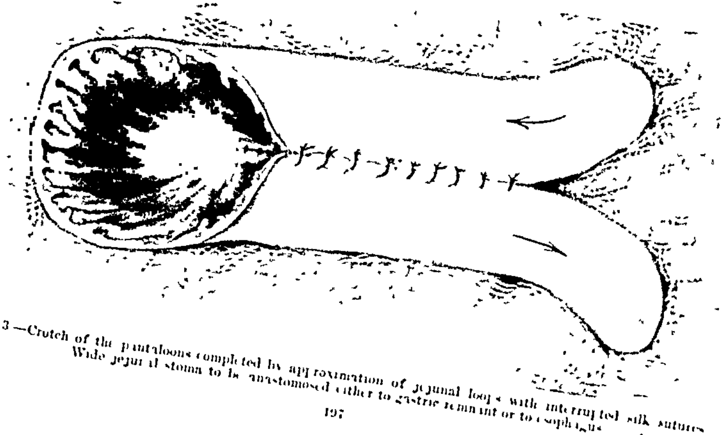
CASE 1.—E. P., a housewife aged 34, was admitted to the hospital on Feb 10, 1949. A subtotal retrocolic gastrectomy by the Finsterer Hofmeister technic for a gastric and duodenal ulcer had been performed elsewhere three years prior to admission. The patient, an ex-nurse, began to have pain and tenderness in the epigastrium soon after the operation. She also had pain to the right of the epigastrium and in the right shoulder blade The pain usually appeared immediately after eating and was accompanied by nausea and vomiting of bile She became flushed and "jittery" and she could feel and hear a rapid heartbeat On certain occasions she could get relief by taking hydrochloric acid. The vomiting of bile also came unexpectedly and was not always related to the taking f food She has not been able to tolerate rich oods, ice cream, chocolate, candy, pie, pastry, milk or carbonated drinks. The stools, which were continuously loose and clay-colored, were occasionally improved by the taking of hydrochloric acid She lost about 20 pounds (9 1 Kg) in weight after her first operation Gastric analysis after histamine stimulation showed the highest free acidity level to be 36 degrees at the end of an hour Roentgen examination revealed the picture of a normal postoperative stomach Gastroscopic examination showed the gastric mucosa to be swollen,

pale in certain areas and dark red in others There was a continuous pouring of foamy intestinal contents into the gastric remnant

The second operation was performed on February 12 I observed a retrocolic subtotal gastrectomy The gastrojejunostomy was disconnected An additional segment of gastric tissue measuring about 1 cm in length was removed Gastrojejunal continuity was then established retrocolically by the pantaloon method

This patient has now regained the 20 pounds (9 1 Kg) she had lost after the first operation The pain in the epigastrium and the right shoulder blade has disappeared She can eat all she wants without "filling up" or becoming nauseated She tolerates raw cabbage chocolate, candy and ice cream, none of which she could eat after the first gastrectomy She does not become flushed or nervous after eating, nor does she notice a rapid heartbeat She does not vomit The stools, which were clay colored and loose, are now formed and of normal color All who know this patient agree that she has made a remarkable recovery, changing from a poorly nourished, asthenic and haggard looking woman into a normal and healthy one

CASE 2 —D R , a farmer aged 26, was admitted to the hospital April 4, 1949 I saw this patient for the first time about a week prior to his admission He had just been examined at a large clinic, where he was advised to have a bilateral vagus resection because of the vomiting of bile after a gastrectomy The patient admitted that he had always been of



ig 3 —Crutch of the pantaloons completed by approximation of jejunal loops with interrupted silk sutures Wide jejunal stoma to be anastomosed either to gastric remnant or to esophagus a nervous temperament. He had been subjected to a gastrectomy for ulcer about four months previously by a competent surgeon in a neighboring town. He made fairly good progress for three weeks after his first operation; then he began to have persistent vomiting of bile and hiccoughs and lost his appetite. He lost 47 pounds (21.3 Kg.) in weight in four months. Encouraged by the results obtained with 2 other patients under similar circumstances, I had no hesitation at this time in recommending the pantaloon operation. He agreed to have the operation but wished to postpone it because of urgent business at his home, which was some distance away. Two days later he telephoned by long distance, saying that he was in the hospital, very ill, and that he was being sustained by intravenous feedings only. On the way home he had become so ill that he was forced to stop in another town, where he was admitted to the hospital and given an intravenous feeding before proceeding home. He asked to be admitted at once. After consultation with his original surgeon, he was admitted to our hospital. He seemed irritable and antagonistic (I was told by his relatives that he had always been of a "cantankerous" nature). He refused water and food while in the hospital. He obtained some relief by means of continuous suction drainage. He was sustained on intravenous feedings for six days prior to the second operation. Roentgen studies showed the usual picture of a resected stomach, with precipitous emptying of a conventional barium meal. He refused gastroscopic examination.

The operation was performed on April 4. It was

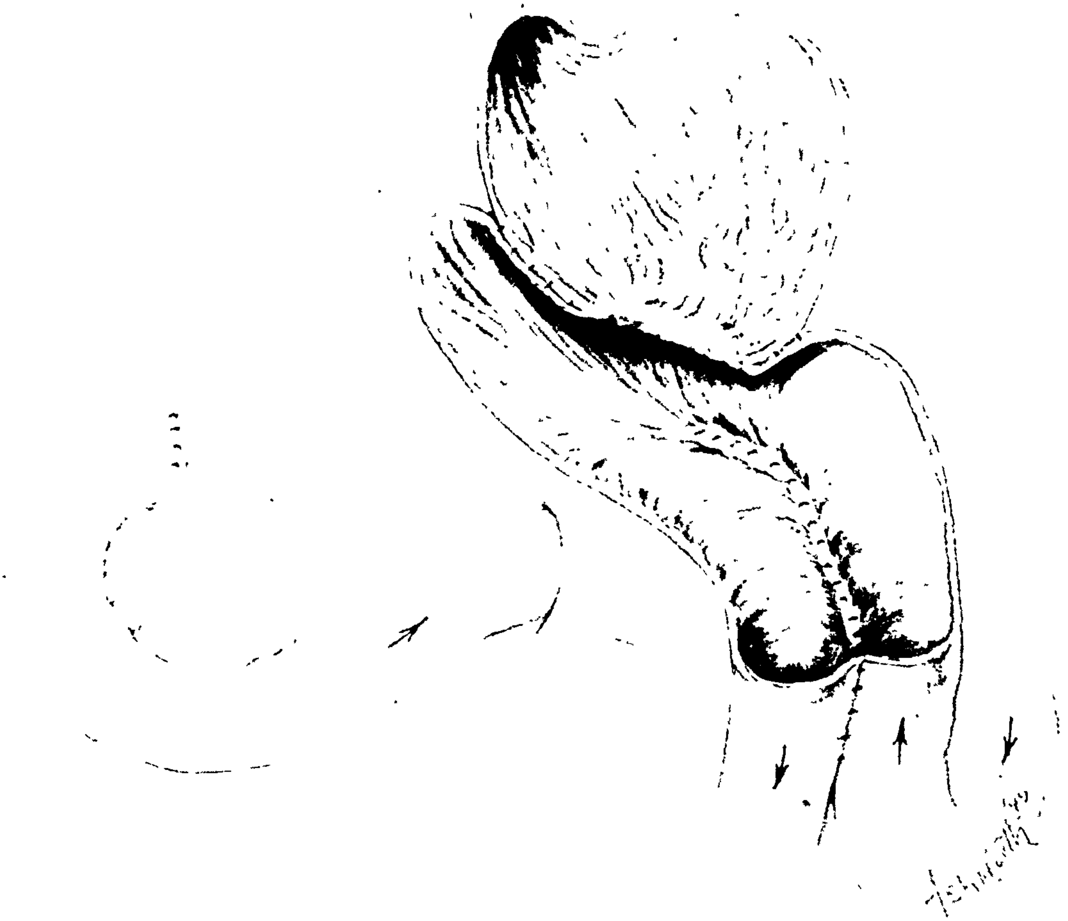


Fig. 4.—Diagram of the pantaloon anastomosis.

observed that about one half of the stomach remained and that the anastomosis presented a typical textbook picture of an antecolic Polya gastrectomy, with the proximal jejunal loop attached to the greater curvature side of the stomach There were few adhesions The anastomosis was in perfect condition. I removed about one fourth of the remaining gastric tissue The gastric mucosa was extremely swollen and had the appearance of hemorrhoidal tissue The opening in the jejunum from the previous anastomosis was prolonged and utilized for the pantaloon reconstructive operation The anastomosis was placed retrocolically The atient made an excellent immediate recovery and egan to take nourishment on the third postopera ve day. However, he displayed his usual impatient d irascible disposition and left the hospital for a 300-mile trip home nine days after the operation, against my advice

I hear from him on frequent occasions He came to see me about one month ago He eats about as much at one time as he did before his first operation. He has gained 45 pounds (20 4 Kg) in weight. However, he has a nauseated burning feeling after meals which lasts about half an hour He is not able to tolerate ice cream, cooked cereal or anything served with cream and sugar He does a long day's work on his farm Gastric analysis after stimulation with histamine showed bile but no free acid in any specimen

COMMENT

I am reasonably sure that the result in Case 2 after the pantaloon reconstructive operation could have been much better if I had not utilized the old jejunal stoma in fashioning the new enteroenteroanastomosis I have learned that such reconversion functions poorly because it makes a bulky anastomosis, with torsion of the jejunojejunal sacculation I have encountered a more serious complication in a patient on whom I performed the pantaloon anastomosis because of a jejunal ulcer which followed a gastroenterostomy In this case I also used the jejunal stoma from the previous gastrojejunostomy as a part of the pantaloon enteroenteroanastomosis An obstruction developed because of protrusion of jejunal tissue into the lumen of the enteroenteroanastomosis. The patient made a complete recovery after another operation These complications can now be avoided either by resection of the jejunal segment or by closure of the previous jejunal stoma The pantaloon anastomosis is then made some distance from the end-to end anastomosis or from the closed stoma in the jejunum

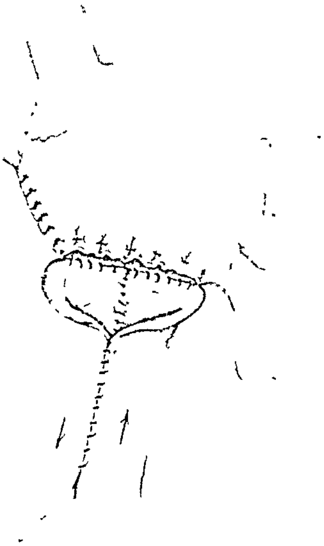


Fig 5 — A variation of the pantaloon gastrectomy In sert shows valvelike formation at the gastrojejunal anastomosis

The effectiveness of this new operation to prevent reflux of the irritating enteric contents into the gastric pouch was apparently responsible for the definite improvement in all of the 5 patients who were operated upon for postgastrectomy difficulties The newly created double lumen sacculation increases with time and acquires the function of storage. Increased storage capacity and delay in the progress of the foodstuff must also be taken into consideration as contributing factors in the recovery of these 5 patients

Some undesirable effects after gastrectomy are unmistakably the result of choosing the wrong procedure Symptoms of greater or lesser degree, however, take place after any

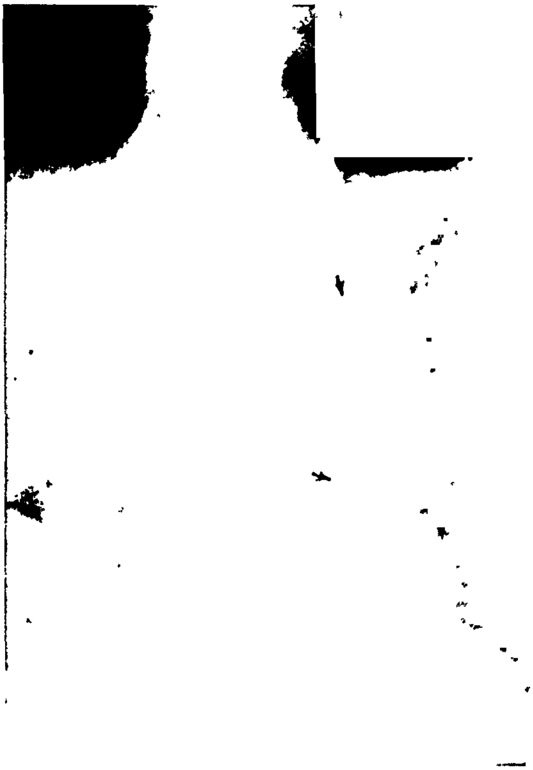


Fig. 6.—Roentgenogram of pantaloon gastrectomy for duodenal ulcer. Arrow indicates crotch of the pantaloons.

type of gastric operation. These symptoms result from alterations in structure and function and from a disturbance in the normal viscerovisceral reflexes. The well-being of the gastrectomized patient even after use of a well chosen technic depends largely on his ability to compensate for radical changes brought about by the operation.

In the new gastrectomy a jejunal pouch is formed by anastomosis of two jejunal loops. The jejunal pouch, which joins with the gastric remnant, prevents regurgitation of bile and pancreatic juices into the gastric lumen. The newly created jejunal pouch may also serve as a substitute for the partial loss of storage capacity in the gastric remnant.

SUMMARY

Four hundred and eighty consecutive and unselected gastrectomies performed by the Finsterer-Hofmeister technic for peptic ulcers and 86 additional gastrectomies for ulcer and cancer performed by the pantaloon method are reported, with a mortality of 1.4 per cent. There were no deaths in the 86 consecutive gastrectomies by the pantaloon procedure.

The pantaloon method of anastomosis, first introduced by the author in 1934, prevents the reflux of intestinal juices into the gastric remnant. The copious reflux of bile and pancreatic secretion into the gastric remnant results in severe gastritis, anorexia, nausea and vomiting, causing chronic disability.

The pantaloon operation abolishes and ameloriates certain intractable disabilities and annoying symptoms not infrequently encountered after gastrectomy performed by the established methods.

Five patients who were reoperated upon by the pantaloon method because of severe manifestations of the postgastrectomy syndrome which followed the conventional method of anastomosis were relieved of the annoying symptoms. All gained weight.

The pantaloon gastrectomy has particular advantages and safety factors in operation for carcinoma of the stomach and for gastric ulcer situated near the cardia in the presence of a

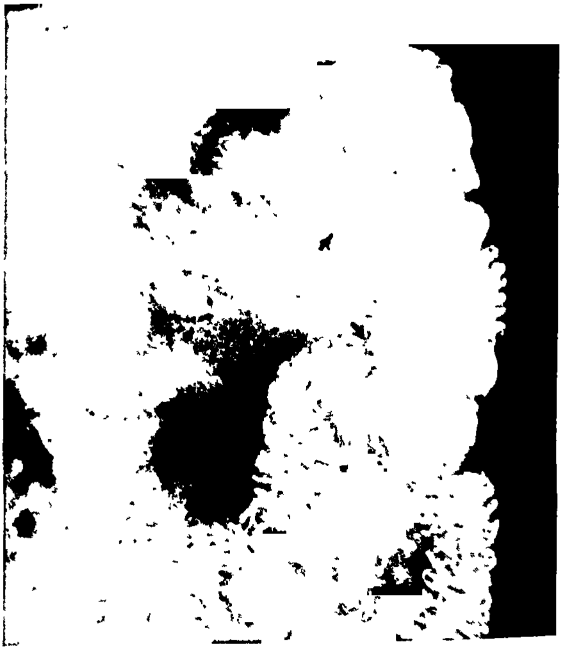


Fig. 7.—Roentgenogram of pantaloon gastrectomy for duodenal ulcer. Arrow indicates crotch of the pantaloons.

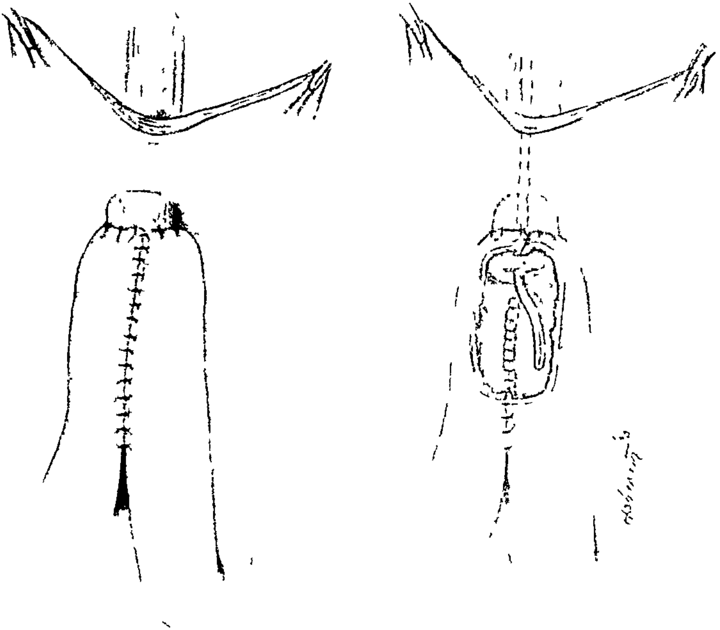


Fig 8—Total gastrectomy by the pantaloon method

minimal gastric remnant A wide area of gastrojejunal approximation is permissible without endangering free passage

This operation is recommended for total gastrectomy because *it is safer than the established* method It also prevents regurgitation of irritating intestinal contents into the esophagus It creates a large storage space as a "substitute stomach"

The pantaloon method of gastrectomy is superior to the established procedure and is now employed for all patients requiring gastrectomy either for ulcer or cancer

RÉSUMÉ

480 cas consécutifs et non choisis de gastrectomie dans lesquels la technique de Finsterer-Hofmeister fut employée pour ulcères peptiques et en plus 86 gastrectomies pour ulcères et cancers dans lesquelles la méthode de pan*taloon fut employée sont rapportés Il y eut* une mortalité de 1,4%. Il n'y eut aucun décès dans 86 gastrectomies opérées par la méthode "pantaloon"

Cette méthode d'anastomose fut introduite par l'auteur en 1934

Cette methode d'anastomose pantaloon empeche le reflux des sucs intestinaux dans le reste de l'estomac Le reflux copieux de la bile et des sucs pancréatiques dans le reste de l'estomac détermine une gastrite aigue, détermine de l'anorexie, des nausées et des vomissements

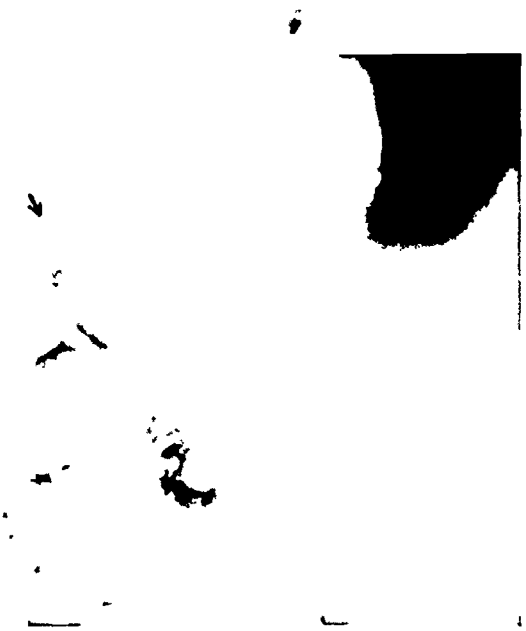


Fig. 9.—Total gastrectomy. Roentgenogram of esophagojejunal anastomosis by pantaloon procedure. Arrows indicate the newly created substitute stomach.

qui tous produisent une incapacité chronique. L'opération pantaloon abolit et améliore certaines incapacités et certains symptômes ennuyeux qu'on rencontre assez fréquemment après la gastrectomie faite d'après les méthodes courantes.

Cinq malades furent opérés par la méthode pantaloon pour remedier aux manifestations sévères de syndromes postgastrectomiques consécutifs aux méthodes d'anastomoses conventionnelles. Ces cinq malades furent soulagés et gagnèrent en poids.

La gastrectomie "pantaloon" à certains avantages et offre des facteurs de sécurité dans les opérations pour carcinome de l'estomac et aussi pour les ulcères gastriques situés près de l'orifice cardia de l'estomac, après ablation étendue de l'estomac.

Elle permet une approximation gastro-jéjunale étendue sans nuire au passage libre des aliments.

L'opération est recommandée pour la gastrectomie totale vu qu'elle offre plus de sécurité que les méthodes courantes. Elle empêche la régurgitation du contenu intestinal dans l'oesophage. Elle crée un "estomac substitut."

Cette méthode est supérieure aux méthodes généralement pratiquées de nos jours. Nous l'utilisons chez tous nos malades dans les cas nécessitant une gastrectomie, soit pour cancers ou soit pour ulcères.

RESUMEN

Se presentan 180 gastrectomías consecutivas y no seleccionadas, realizadas por el método de Finsterer-Hofmeister para tratar la úlcera y 86 gastrectomías adicionales para el tratamiento de las úlceras el cáncer por el método "en pantalón," con una mortalidad de 1,4 por ciento. En el segundo grupo tratado por la anastomosis "en pantalón" no se registró ninguna muerte.

El método de la anastomosis "en pantalón" fué introducido por vez primera por el autor en 1934.

Esta anastomosis previene el reflujo de la secreción intestinal dentro del contenida gástrico, el copioso reflujo de bilis y secreción pancreática dentro del contenido intestinal determina una grave gastritis, anorexia, náuseas y vómitos, causando un trastorno crónico.

El método de la anastomosis "en pantalón" elimina y mejora ciertas complicaciones intratables y otros síntomas enojosos que se hallan con cierta frecuencia después de practicar una gastrectomía por el método habitual.

Se volvieron a intervenir por segunda vez 5 pacientes utilizando el método "en pantalón" por las manifestaciones graves del síndrome presentado en la postgastrectomía, como resultado del método habitual de anastomosis, observándose que todos los pacientes se aliviaron de los síntomas molestos, ganando peso todos ellos.

La gastrectomía "en pantalón" tiene manifiestas ventajas y es más segura para operar el cáncer del estómago y la úlcera gástrica situada cerca del cardias, en presencia de un remanente gástrico mínimo. Es posible, en tal caso, practicar la aproximación a través de una técnica gastroyeyunal sin que ello represente ningún peligro para que se mantenga abierta dicha vía digestiva.

Esta operación se recomienda para las gastrectomías totales por ser más segura que el método habitual, ya que previene la regurgitación del contenido intestinal que tiene un efecto irritante, dentro del esófago, creando un amplio espacio de almacenamiento que se utiliza como un "estómago de reemplazo"

El método de la gastrectomía en pantalon es superior al método establecido y se emplea en todos los pacientes que requieren una gastrectomía, bien sea para tratar una ulcera o un cancer

RIASSUNTO

Riporta una casistica di 480 consecutive gastrectomie eseguite col metodo di Finsterer-Hofmeister per ulceri peptiche, piu' 86 gastrectomie eseguite col metodo a pantalone per ulceri e carcinomi La mortalita' complessiva e' stata dell'l, 5%, da notare pero' che nella serie delle 86 gastrectomie a pantalone non e' occorso un solo caso letale

Steinberg e' stato il primo a proporre (nel 1934) questo metodo di anastomosi, che previene il riflusso dei liquidi intestinali nel moncone gastrico Un passaggio copioso di bile e di secreti pancreatici nello stomaco conduce ad una gastrite, anoressia, nausea, vomito, ad una vera e propria disabilita'

L'anastomosi a pantalone elimina o attenua taluni di questi sintomi, cosi comuni dopo le gastrectomie eseguite con le solite tecniche Questa superiorita' di risultati viene confermata dall'osservazione di 5 casi, nei quali una seconda anastomosi a pantalone dopo una prima anastomosi eseguita con i soliti metodi ha eliminato tutti gli inconvenienti della prima operazione, con un aumento di peso dei pazienti

La gastrectomia a pantalone offre particolari vantaggi e margini di sicurezza nelle operazioni per carcinomi ed ulceri gastriche situate in prossimita' del cardia, con un minimo residuo dello stomaco L'operazione consente infatti una vasta area di approssimazione gastro digiunale, senza compromettere un libero passaggio E' anche raccomandabile per gastrectomie totali perche' piu' sicura degli altri metodi operatori mentre previene un'irritazione dell'esofago da rigurgito dei liquidi intestinali e crea un ampio spazio che si sostituisce allo stomaco L'A eseguisce percio' l'anastomosi a pantalone in tutti i pazienti che richiedono una gastrectomia, sia per ulcera, sia per carcinoma

ZUSAMMENFASSUNG

Die Arbeit berichtet ueber 480 aufeinanderfolgende und unausgewaehlte Magenresektionen mit Finsterer Hofmeister Technik wegen Ulcus pepticum und ausserdem ueber 86 Magenresektionen wegen Geschwuers und Krebses nach der Pantaloon Methode Die Sterblichkeit war 1,4% Kein Todesfall betrifft die 86 aufeinanderfolgenden Magenresektionen nach der "Pantaloon Methode

Die "Pantaloon' Anastomose wurde zuerst vom Verfasser im Jahre 1934 eingefuehrt

Die Methode verhindert den Rueckfluss von Duenndarmsaeften in den Magenstumpf Reichlicher Rueckfluss von Galle und Pankreassaft in den Magenstumpf fuehrt zu schwerem Magenkatarrh Appetitlosigkeit Uebelkeit und Erbrechen und schliesslich zu chronischer Invaliditaet

Gewisse unheilbare Krankheitszustaende und laestige Symptome denen man nicht selten im Gefolge der allgemein ueblichen Magenresektion begegnet, wurden durch die "Pantaloon" Operation aufgehoben oder verbessert Fuenf Kranke, die wegen schwerer nach konventioneller Magenresektion auftretender Erscheinungen mit der "Pantaloon' Methode nachoperiert wurden, wurden von ihren laestigen Symptomen befreit und nahmen ziemlich an Gewicht zu

Besondere Vorteile und Sicherheitsfaktoren bietet die "Pantaloon" Resektion in der Behandlung des Magenkrebses und des kardianahen Magengeschwueres, wenn nur ein sehr kleiner Magenrest vorhanden ist Sie erlaubt eine weite Strecke gastrojejunaler Annaeherung, ohne den freien Durchfluss zu gefaehrden

Die Operation wird fuer Totalresektionen empfohlen, weil sie sicherer ist als die allgemein uebliche Methode Sie verhindert auch das Wiederausstossen reizenden Darminhalts in die Speiseroehre und schafft einen grossen Speicherraum als "Magenersatz"

Die "Pantaloon" Methode der Magenresektion ist der ueblichen Prozedur ueberlegen und wird jetzt bei allen Kranken die wegen Geschwuers oder Krebses eine Resektion brauchen angewandt

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Primary Carcinoma of the Duodenum

Report of a Successful Whipple Operation

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AND JERRY ZASLOW, M.D., F.A.C.S., F.I.C.S.
PHILADELPHIA

THIS report is of interest for two reasons: first, it describes an uncommon primary gastrointestinal malignant tumor; second, it demonstrates that advanced age is not necessarily a contraindication to extensive surgical procedures.

REPORT OF CASE

M. B., a 74 year old white man, was admitted to the medical service of the Jewish Hospital on July 29, 1949, complaining of daily morning vomiting, increasing constipation and a sense of fullness and pressure in the lower part of the abdomen. There were anorexia, generalized weakness and a loss of 12 pounds (5.4 Kg.) in weight. All of these symptoms had been present for two weeks before admission. The vomitus was profuse and projectile and contained food eaten on the preceding day. The systemic review revealed anginal pain, exertional dyspnea on exertion, edema of the ankles, frequency of urination and nocturia of two years' duration. During this time the patient had been taking digitalis.

Physical examination revealed that the patient was dehydrated but in no acute distress. The temperature and the pulse and respiratory rates were normal. The systolic blood pressure was 110 mm. of mercury and the diastolic pressure 60 mm. The only pertinent observations were an indefinite fullness in the epigastrium and a smooth symmetrically enlarged prostate.

Clinical laboratory studies of the blood revealed the following values: hemoglobin 10.3 Gm., erythrocyte count, 3,600,000 per cubic millimeter, and leukocyte count, 9,950, with a normal cytologic distribution. The results of urinalysis and the bromsulfalein liver function test, as well as the values for serum amylase and lipase, blood urea, carbon dioxide combining power and serum chlorides were all within normal limits. No free hydrochloric acid was observed in the stomach after histamine stimulation. The stool contained occult blood.

Sigmoidoscopic examination revealed diverticulosis. A roentgenogram of the chest showed only atherosclerosis of the aorta and pulmonary emphysema. Roentgen studies of the gastrointestinal tract demonstrated a normal esophagus, a dilated stomach, a duodenal cap and a descending duodenal limb, and a filling defect in the third portion of the duodenum with retardation of emptying of the descending duodenal limb. At the end of three hours there was still 90 per cent gastric retention (Fig. 1 A and B).

The patient was prepared for an exploratory procedure by daily gastric lavage, by parenteral feedings of dextrose, water, salt and proteins and by numerous blood transfusions.

On August 25, with the patient under spinal anesthesia supplemented by intravenous pentothal and curare, operation was performed. Exploration revealed an intraluminal tumor of the third portion of the duodenum. There was no evidence of local infiltration beyond the confines of the duodenum, and distant metastasis was not observed. The gallbladder contained stones. The operative procedure consisted of cholecystectomy, partial gastrectomy, total duodenectomy, partial pancreatectomy, partial choledochectomy and reestablishment of gastrointestinal and biliary intestinal continuity by an end to side choledochojejunostomy, an end to side pancreaticojejunostomy over a catheter and an end to side gastrojejunostomy, in that order (Fig. 2 A and B).

Study of the resected specimen revealed a polypoid tumor in the third portion of the duodenum on a broad base measuring 6 by 6 by 3 cm. (Fig. 2 A and B). Microscopic examination showed the lesion to be an adenocarcinoma (Grade 2, Broders) invading the wall of the duodenum (Fig. 4). None of the lymph nodes removed was involved by the lesion.

The postoperative course was uneventful, the patient leaving the hospital on the fourteenth day. All hematologic studies done before discharge from the hospital gave normal results. The catheter used for the pancreaticojejunal anastomosis was passed in the feces four weeks later. When last seen in October 1951, two years and two months later, the patient was completely asymptomatic.

COMMENT

Incidence, Pathologic Picture.—Primary

From the Surgical Service of the Jewish Hospital, Philadelphia.
Submitted for publication April 1, 195[illegible].

duodenal carcinoma is relatively rare. Hoffman and Pack[1] noted that the incidence of this lesion was 0.033 per cent in over 350,000 autopsies. Mateer and Hartman[2] observed only 6 cases in 176,000 autopsies and estimated that 0.25 per cent of all carcinomas and 3 per cent of all intestinal tumors were duodenal. Carcinoma is more common in the duodenum than in either the ileum or the jejunum. Lesions in the second portion are more common than in the other portions, and those in the third portion are least common.

Carcinoma of the duodenum is usually adenocarcinoma. Sarcomas and benign tumors are uncommon. A carcinoma of the first portion is usually secondary to pancreatic or a gastric carcinoma, the latter invading the duodenum either through the lymphatics or by the submucosal route; extension via the mucosa is rare. Duodenal lesions may be polypoid, sessile, ulcerative or annular (completely encircling the lumen in some cases), the symptoms depending on these characteristics. Regional lymph nodes are involved early, but distant spread is a late manifestation.

It has been suggested that carcinoma of the duodenum is the result of repeated ulcerations. That this is unlikely is demonstrated by the fact that 99.2 per cent of duodenal ulcers occur in the first portion, while carcinoma of this segment is decidedly uncommon.

Malignant changes in aberrant gastric glands, pancreatic rests and Brunner's glands have been suggested by some as the basis for carcinoma. However, Robertson[3] observed only 2 instances of proliferation in Brunner's glands.

The relation to polyposis is also uncertain. Gastric polyps are commonly found in routine autopsy study, but duodenal polyps are infrequent, and although carcinomas of the duodenum are often grossly polypoid, they are rarely seen in association with other polyps.

Forgue and Chauvin[4] expressed the opinion that fixation to the parietes, the presence of four flexures, and the fact that the duodenum is the most widely dilated portion of the small intestine explains the higher incidence of carcinoma of the duodenum as compared with that of carcinoma in the mesenteric small bowel.

Rankin and Mayo[5] have stated that the fluid nature and alkalinity of the small bowel contents, as well as the absence of abrupt bends

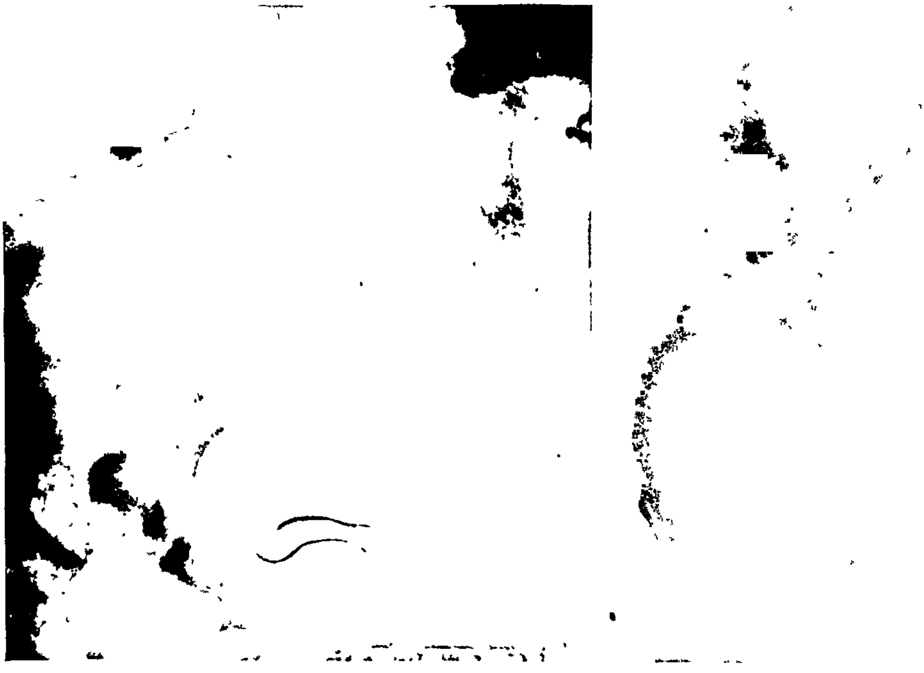

Fig. 1.—*A*, roentgenogram showing the filling defect of the third portion o

of the lumen. *B*, roentgenogram showing the dilatation of the stomach.

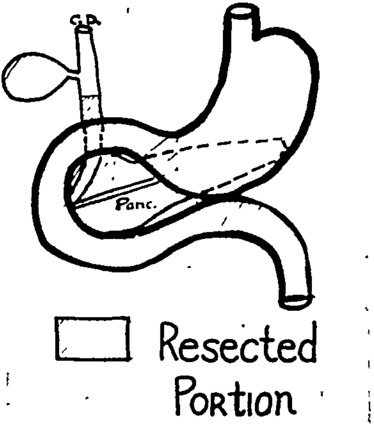

Fig. 2.—Diagrammatic representation of resected structures.

in the small bowel, probably explains the rarity of lesions in this structure.

Symptoms.—Lesions in the duodenum are usually considered supra-ampullary, periampullary or infra ampullary, because of the difference in the symptomatic picture produced by lesions at these levels.

Supra-ampullary growths usually produce an ulcer-like syndrome. Pain is common but is not relieved by food. Gross bleeding is a late symptom, although occult blood in the stools is common and occurs early. Obstruction is a late symptom. Jaundice and pancreatic disturbances are uncommon and, if present, indicate a late lesion with extension to the pancreas and bile ducts.

Periampullary lesions are usually diagnosed early, since they readily produce jaundice and obstruction of the pancreatic duct. Tumors in this region are most difficult to differentiate from lesions of the common duct (stone, stricture or growth), since jaundice is an early symptom of both. Tests for obstruction of the pancreatic duct (serum lipase, ferments obtained by duodenal aspiration) will help to rule out common duct stricture, stone or carcinoma, although carcinoma of the ampulla itself will not be differentiated. However, since the treatment of both preampullary duodenal and primary ampullary lesions is the same this differentiation is merely academic.

Infra-ampullary lesions are the most difficult to diagnose. The patient often complains of vague epigastric fullness, gaseous distention, anorexia and loss in weight. These symptoms are due to incomplete duodenal obstruction and, when this becomes complete, retention vomiting is a prominent complaint. There is no abnormality of pancreatic function while this lesion is still confined to the duodenum.

In the presence of any of these lesions the roentgen ray is of great help in establishing the diagnosis. A filling defect is often demonstrated, and at times actual ulceration is seen in the lesion. As in our case obstruction of the proximal portion of the duodenum and of the stomach is sometimes seen.

Treatment.—When the presence of a duodenal lesion is suspected, surgical exploration is indicated. When resection is possible it should be done. Palliative surgical intervention may be indicated for an unresectable growth producing jaundice or intestinal obstruction. Local excision of a tumor has been done and has on occasion resulted in long survival. However, because of the fact that regional lymph nodes are involved early, it is

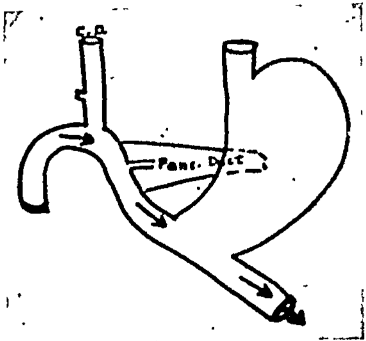

Fig. 3.—Diagrammatic representation of reconstructed structures.

(J Z.[7]), it is our impression that when obstruction of the common duct is not present (as in supra-ampullary or infra-ampullary lesions) or when obstruction is present and is not associated with cholangitis, the biliary tract should be anastomosed to the jejunum proximal to the gastrojejunostomy. When cholangitis is present it does not matter whether the anastomosis is proximal or distal. It is our opinion that whenever possible the pancreas should be anastomosed to the bowel. We prefer using the common duct rather than the gallbladder for anastomosis, since the pressure in the former is greater and ascending infection is less likely to develop. In addition, the cystic duct may enter the common duct at a low level, and if the cut end is merely ligated the cystic duct may also be ligated and obstructive jaundice may follow.

All the principles just outlined were followed in operating on the patient who served as the subject of this communication.

Prognosis.—Up to 1945, Brunschwig and Tiholiz[8] found that only 16 resections for infra-ampullary lesions had been performed One patient died six years after the operation and 3 lived twelve, fifteen and twenty months respectively. These authors reported 3 personal cases In 1 a local resection had been done, and the patient was living and well seven years and ten months later, they stated, however, that the lesion was a carcinoma resembling a carcinoid, and since carcinoids grow less rapidly than does the usual adenocarcinoma, this may explain the long survival in spite of local excision In another case local resection was also done, and the patient was living and well three years later the lesion was a spindle cell carcinoma with nodal involvement A Whipple operation was performed on the third patient but he died three months later of a deep intra-abdominal abscess

In 1945 Orr and Walker[9] reported a personal case in which a Whipple operation was done The patient died seventeen and one half months later of metastasis

Of 33 cases of carcinoma of all portions of the duodenum in the literature Berger and Koppelman[10] noted that palliative operations were performed on 22 patients all of whom died in three months

Dixon and his co-workers analyzed 49 cases of malignant lesions of the duodenum from the records of the Mayo Clinic Of patients with lesions of the third portion, they found

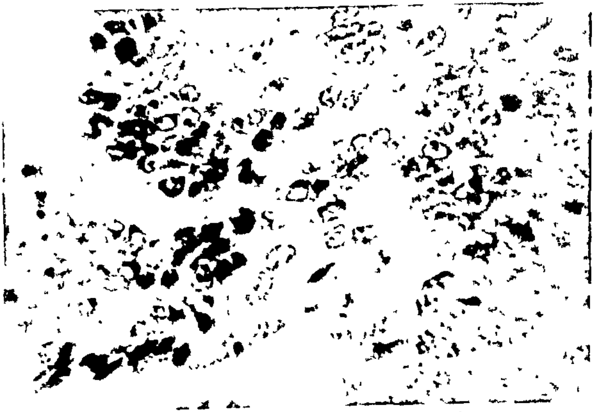

Fig. 6.—High power microscopic section of the lesion Mitotic figures are seen.

Unicornuate Uterus Associated with Agenesis of the Kidney

Report of Two Cases

AUGUST F. DARO, M.D., F.I.C.S.; HARVEY A. GOLLIN, M.D.
AND ERNEST G. NORA, JR., M.D.
CHICAGO

THIS is a report of the thirty-first and thirty-second cases of unicornuate uterus associated with agenesis of the kidney.

The literature on congenital anomalies of the genitalia associated with unilateral renal agenesis was thoroughly reviewed by Shumacker[1] in 1938. His review was particularly directed to the association of renal agenesis and true unicornuate uterus. Two additional cases have been reported (by Varino and Beacham in 1941[2] and Alexander in 1947[3])

In reviewing the literature, it was found that 30 such cases have been reported. In 23 of these the condition was discovered at autopsy and in the remaining 7 at laparotomy. In 1 of the cases described here it was observed at laparotomy, making it the eighth of its kind. In the other it was discovered at autopsy, the twenty-fourth such instance reported.

The frequent association of congenital anomalies of the urinary and reproductive systems can be explained embryologically, as both systems have their origin from the mesoderm as a common urogenital ridge. Further growth brings a subdivision into nephric and genital regions which drain into a common urogenital sinus. In the male this is utilized permanently as a common urinary and genital duct—the urethra.

In both sexes there develops a pair of female ducts (ducts of Muller). Human embryos at 10 mm. first indicate the future mullerian ducts by a groove of thickened epithelium of each urogenital ridge. This furrow is located laterally on the mesonephros, the first functional kidney in mammals. The mullerian ducts close as they grow more caudally and form a closed tube, the cephalic end of which remains open.

A mullerian duct by [illegible] growth of its blind end courses [illegible] the mesonephric duct with which its [illegible] related.

The mullerian [illegible] in the midline [illegible] the genital canal. The fused common [illegible] the first indication of [illegible] and vagina. The more cranial portions remain separate and serve as fallopian tubes.

It is hoped that the following report of 2 cases will stimulate the search for congenital anomalies of the genitalia in the presence of renal agenesis and vice versa.

REPORT OF CASES

CASE 1.—S. D., a white woman aged 22, was admitted to the Cook County Hospital on Aug. 16, 1940, complaining of abdominal pain of five days' duration. The pain was "cramping" and moderately severe, seeming to predominate in the right lower quadrant. The last normal menstrual period had occurred on May 11. Only July 25 the patient noted a small amount of vaginal bleeding associated with suprapubic cramping pain. This bleeding and pain lasted for five days. There was no shoulder pain and no fainting or feeling of faintness. There had been no vaginal bleeding since July 30. The patient also complained of fulness of the breast and occasional nausea of several weeks' duration.

The family history was essentially noncontributory. The medical history revealed that the patient had had rheumatic fever at the ages of 11 and 17 years and a "nervous breakdown" in 1929. Tonsillectomy and adenoidectomy had been performed in 1922.

Menstruation began at the age of 14 and occurred regularly every twenty-eight days, lasting five days, with a normal flow. There was no menometrorrhagia, dysmenorrhea or leukorrhea. The patient had never been pregnant, but thought that she might be pregnant at the time of admission.

From the Departments of Obstetrics, Cook County Hospital and Columbus Hospital, and the College of Medicine, University of Illinois, Chicago.

Submitted for publication June 30, 1950.

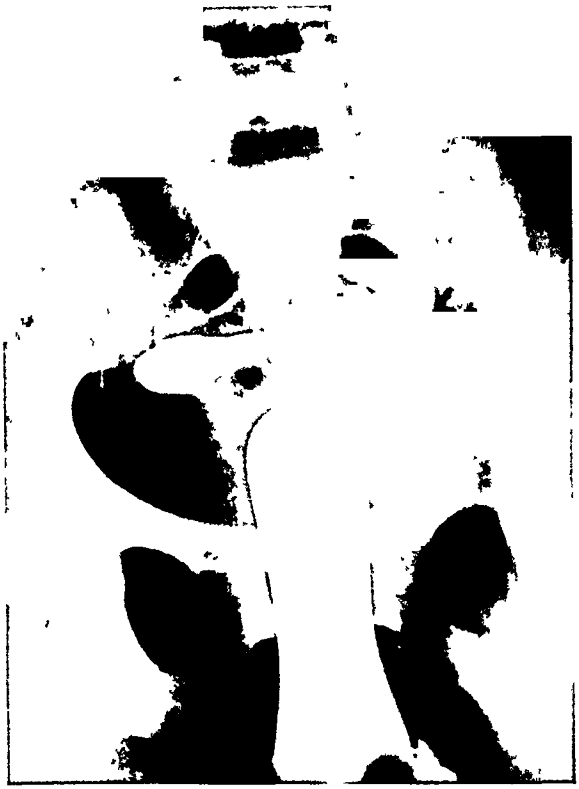

Fig. 1.—Hysterosalpingographic film (Case 1). Note the unicornuate uterus lying in a horizontal plane to the right. The right fallopian tube is outlined. No fallopian tube is evident on the left.

The history by systems was noncontributory.

Physical examination revealed the patient to be well developed and well nourished. She did not appear acutely ill. The temperature was 99.4 F.; the pulse rate, 86 per minute; the respiratory rate, 16 per minute, and the blood pressure 110 systolic and 64 diastolic. General physical examination revealed that the breasts were full, and secretion from the nipple was obtained by pressure. There was a soft apical systolic murmur. Abdominal examination revealed mild tenderness in the right lower quadrant.

Pelvic examination revealed normal external genitalia. Bartholin's glands, Skene's glands and the urethra were within normal limits. The cervix pointed posteriorly; it was nulliparous and softened. There was slight pain on movement of the cervix. No mass suggestive of the uterus was palpable. There was a tender sausage-shaped cystic mass in the right adnexal region. The left adnexal area revealed no palpable pathologic change. Speculum examination revealed bluish discoloration of the cervix.

Laboratory studies were performed. The Kahn reaction was negative. A urethral smear was n tive for gram-negative intracellular diplococci. nalysis revealed cloudy urine, a trace of albu and no sugar; microscopic examination reve many white blood cells, with clumping. The b count showed 3,850,000 red cells and 10,400 le cytes per cubic millimeter, with a normal diffe tial count and 70 per cent hemoglobin.

The impression was that of ectopic pregna Abdominal exploration was deemed advisable.

Abdominal laparotomy, performed on Augus revealed an intrauterine pregnancy of two and half months' gestation. The corpus lay in the r iliac fossa. The right fallopian tube, the r ovary and the right broad ligament appeared mal. The left ovary lay along the pelvic brim the lateral pelvic wall. Attached to the ovary the mesosalpinx was the short fimbriated en the fallopian tube. The proximal end of the was closed and tapered off into the parietal toneum. A thin strand of tissue was present was thought to be the round ligament. It exte along the parietal peritoneum of the pelvic from the region of the internal inguinal rin the left lateral cervical region. The remai structures of the left broad ligament were identifiable.

The course was uneventful, and the patient discharged from the hospital on the tenth operative day.

She was readmitted on October 6 for studies. Intravenous pyelographic examinatio vealed a small amount of dye in the right ki and ureter. The left kidney and ureter were visualized.

On Feb. 17, 1941, the patient was delivered living full-term fetus after a normal labor la ten and one-half hours. An estimated 700 c blood was lost immediately post partum. The bl ing was controlled by the use of obstetrical p trin and ergotrate. The patient was given 500 blood intravenously. The postpartum course normal, and she was discharged on the ninth

She was readmitted on June 10 for further studies. A No. 24 McCarthy cystoscope was pa with ease. The bladder contained 3 ounces of urine. The urethra was moderately injected otherwise normal. The vesical neck appeared mal. The bladder mucosa within the vesical and in the region of the anatomic trigone wa jected and revealed evidences of follicular hy plasia. The right ureteral orifice appeared in mal position at the extreme lateral aspect of interureteral ridge; in following this ridge right to left, however, it was noted that the abruptly disappeared or stopped in the mid No left ureteral orifice was seen, and the i ureteral ridge was absent on the left side Indigo carmine was injected intravenously and appeared in eleven and one half minutes as efflux from the right ureteral orifice No dye was noted coming from any other region of the bladder after twenty minutes The bladder mucosa was otherwise normal No calculi and no neoplasms were noted

The patient became pregnant again and had a normal spontaneous delivery of an eight month fetus on Aug 5, 1942, but again suffered excessive blood loss immediately post partum, estimated at 600 cc

Case 2—This case was found after a search through the records of approximately 10,000 post mortem examinations performed on female patients at the Cook County Hospital Morgue from 1929 through 1948

A 48 year old white woman was admitted to the Cook County Hospital on Sept 21, 1936, with a history of attacks of sharp pain in both right abdominal quadrants The pain was associated with constant vomiting During recent months she had lost 30 pounds (14 1 Kg) in weight She had also had diarrhea during the week prior to admission

The history revealed selective food dyspepsia for several years, but all foods had caused distress for several weeks prior to admission The patient also complained of dyspnea She was conscious of her heartbeat and had coughed blood on several occasions

She had never menstruated, and although she had been married for several years she had never had intercourse An appendectomy had been performed when she was 28 years old

Physical examination revealed the patient to be poorly nourished and poorly developed She appeared acutely ill The temperature was 98 2 F the pulse rate, 104 per minute, the respiratory rate, 24 per minute, and the blood pressure 1[illegible]0 systolic and 115 diastolic Physical examination revealed no abnormalities except those in the pelvis Pelvic examination revealed the vaginal mucosa to be atrophic The introitus admitted one finger The vagina ended in a blind pouch about 4 cm inside the vulva The cervix, corpus and adnexae were not palpable

The erythrocyte count was 2,000,000 per cubic millimeter, with 54 per cent hemoglobin, the leukocyte count, 19,200 The urine gave a 4 plus reaction for albumin

The patient's course in the hospital was gradually downhill She became dyspneic, semistuporous and apparently uremic She died four days after admission to the hospital

Postmortem examination produced the following anatomic diagnoses

1 Chronic glomerular nephritis of the ectopic right kidney
2 Agenesis of the left kidney and left ureter
3 Agenesis of the right fallopian tube and the cervix uteri
4 Hypoplasia of the ovaries and the left fallopian tube
5 Uterus unicornis dexter solidus
6 Atresia and hypoplasia of the vagina
7 Moderate hypertrophy of the heart with recent fibrinous pericarditis
8 Ulcer scar of the stomach
9 Old appendectomy

The following is a description of the urogenital system as obtained from the record

The left kidney and ureter [illegible] The right kidney is located [illegible] the [illegible] of the pelvic bone The renal artery supplying the kidney originates near the bifurcation of the aorta The renal vessels enter and leave the kidney [illegible] the upper pole The pelvis [illegible] medially [illegible] and outside the kidney, being connected by [illegible] elongated calyces The kidney [illegible] and [illegible] shaped, measuring 10 cm in length [illegible] in trans

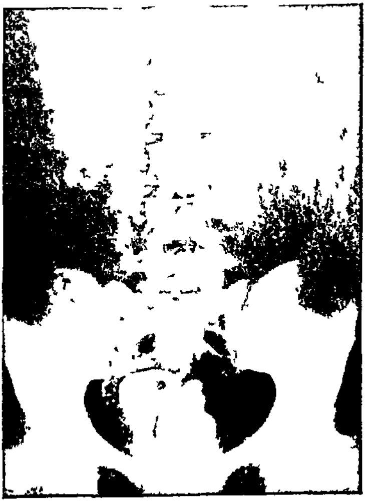

Fig 2—Simultaneous intravenous pyelographic and hysterosalpingographic film (Case 1) with nonvisualization of the left kidney and ureter

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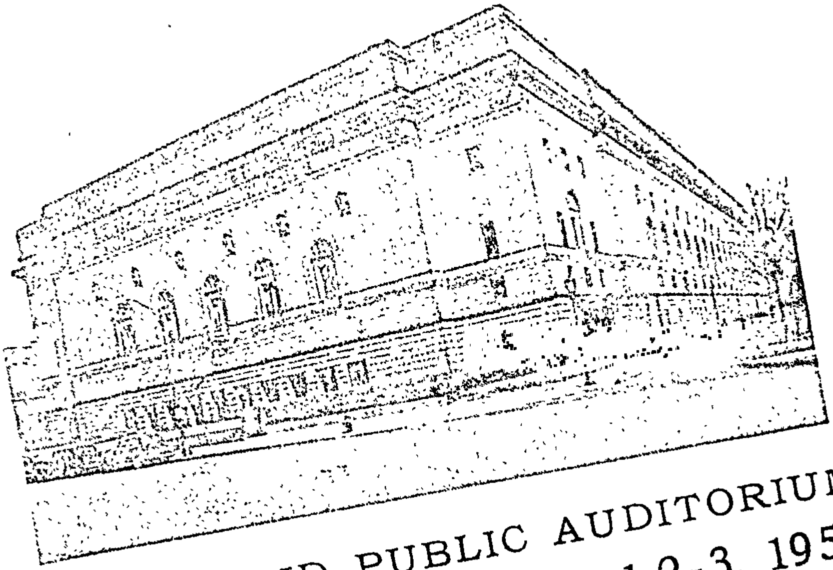

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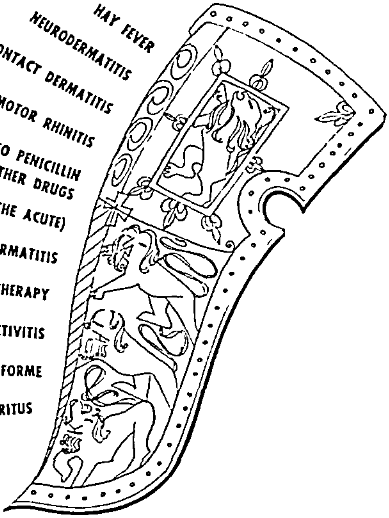

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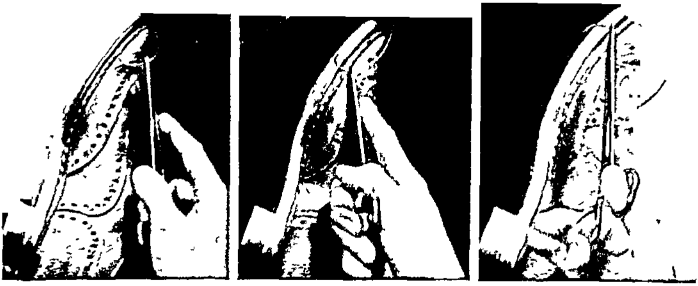

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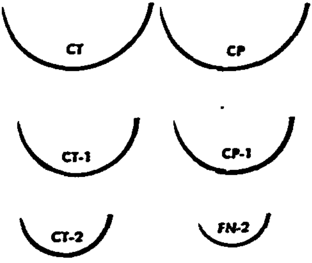

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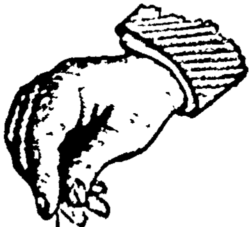

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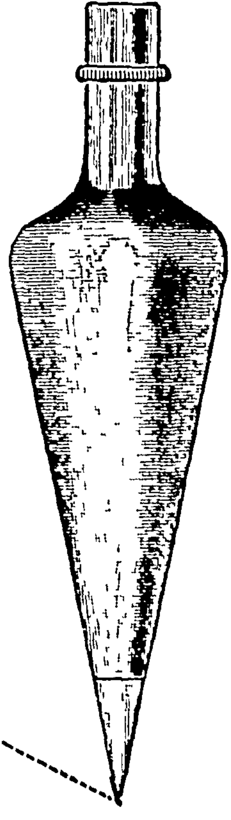

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SIXTEENTH ANNUAL ASSEMBLY, UNITED STATES CHAPTER

Chicago—September 11-14 inclusive, 1951

SEVENTEENTH ANNUAL ASSEMBLY, UNITED STATES CHAPTER

San Francisco, California—October 28-31 inclusive, 1952

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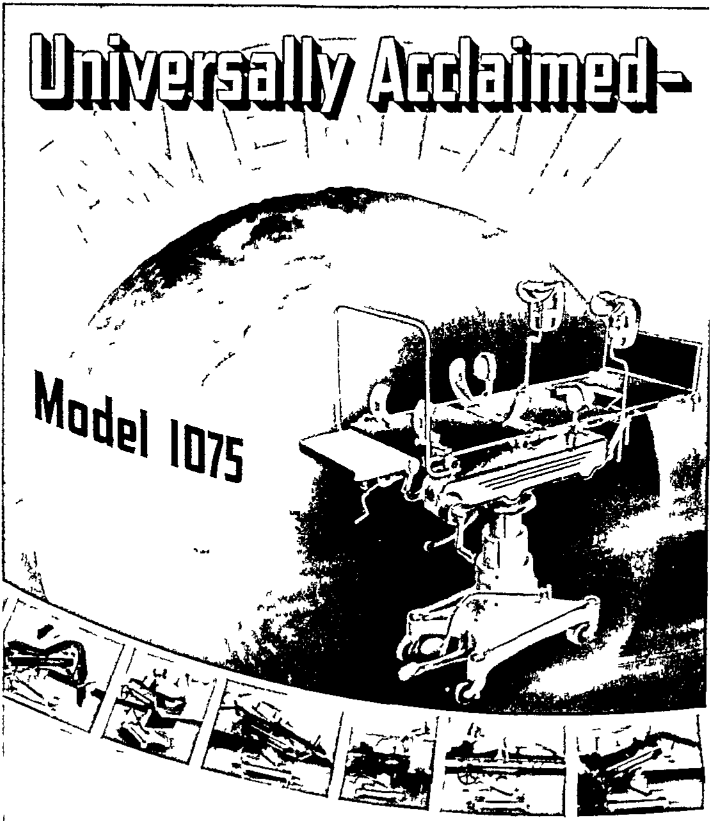

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The Journal of the
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Original Articles

Surgical Consideration of Intraspinal Tumors

ALFRED W ADSON, M D, F A C S, F I C S (HON)
ROCHESTER, MINNESOTA

ONE cannot overemphasize the importance of an early diagnosis of intraspinal lesions since most of them are benign and are amenable to surgical treatment. Tumors originating from the meninges, nerve roots, blood vessels and supporting tissues of the spinal column outnumber those originating within the spinal cord in a ratio of 4 to 1. The recognition and removal of protrusions from the intervertebral disks have likewise expanded the field of spinal surgery.

Since the growth of primary intraspinal tumors results in a gradual compression of nerve roots and the spinal cord, the symptoms of nerve root pain, paresthesia, anesthesia, paralysis and disturbed reflexes gradually increase in severity until complete paraplegia occurs. Therefore it is obvious that the earlier an intraspinal tumor can be recognized and removed the less will be the damage to the spinal cord and the more complete will be the recovery. Unfortunately gliomas of the cord do not lend themselves to radical removal. Laminectomy with decompression and occasionally partial removal of the tumor delays the progress of the symptoms. Little or nothing is accomplished by attempting surgical intervention for primary malignant tumors of the spinal column or by attempting removal of metastatic nodules from within the spinal canal.

In the earlier history of surgery of tumors of the spinal cord, patients rarely sought surgical treatment until they were incapacitated by spastic paralysis and presented losses of dermal sensation below the level of the intraspinal tumor. The chief reason for this delay in treatment was probably the fact that the knowledge of the life history of various tumors that develop within the spinal canal was inadequate. With increased experience in dealing with these growths, technical aids have been developed, such as roentgenographic study, spinal puncture and myelographic examination. These auxiliary technics assist not only in the localization of neoplasms but in differential diagnosis. They have made it possible to recognize intraspinal tumors at the onset of their growth.

SYMPTOMS

The early symptoms and the manner in which they develop depend to a great degree on the location and character of the tumor.[1]

From the Section on Neurologic Surgery, Mayo Clinic. Read at the Fourteenth Annual Assembly, United States Chapter, International College of Surgeons, Atlantic City, November 1949.
Submitted for publication Nov 2, 1949.

In reviewing a large series of intraspinal tumors at the Mayo Clinic[2] my colleagues and I found that 18 per cent were located in the cervical, 54 per cent in the thoracic, 21 per cent in the lumbar and 7 per cent in the sacral region. Since tumors may arise from any of the tissues within the spinal canal—cord, meninges, nerves, blood vessels, fat, ligaments, cartilage or bone—the early symptoms depend upon the degree of neurogenic involvement. If a nerve root is the first structure to be irritated, root pain will be the complaint. If compression of the spinal cord takes place because of a growing mass, the symptoms will correspond to the impairment of the particular spinal tract involved. The growth of an intramedullary tumor results in destruction of spinal cord fibers, which gives rise to corresponding loss of function. The fact that the spinal cord is surrounded by three membranes is also significant, since tumors that are located on the outside of the dura, or that are within the dura but have not invaded the innermost membrane, pia mater, usually produce indentations in the spinal cord instead of invasions of it. This fact also makes it possible to remove these tumors completely.

Intraspinal tumors may develop at any age; most of them, however, occur in the third, fourth and fifth decades of life. Neurofibromas, sarcomas and congenital lesions do develop in childhood and early adolescence.[3] Meningiomas tend to develop in persons over 30 years of age.

Frazier,[4] in referring to the symptoms produced at the different stages of tumor growth, stated that they go through three cycles.

The *first cycle,* characterized by root pain, is a rather common phenomenon, since 50 per cent of intraspinal tumors are extramedullary and are attached to, or produce traction on, one or more of the sensory roots. The duration of this cycle usually continues from one to four years before evidence of paralysis develops. The character of the pain is nearly pathognomonic, since it persists in a localized area and extends over the same nerve root. It is of the lancinating type and is aggravated by coughing, sneezing, lifting and straining at stool. It invariably awakens the patient from sleep in four to six hours after retiring, and often becomes so severe as to compel him to walk the floor or sleep in a sitting position. The mechanism that produces this pain apparently is due to the ball-valve action of the tumor. The tumor is forced downward by the increased pressure of cerebrospinal fluid. This produces traction directly or indirectly on the nerve root. Unfortunately, many patients with this condition are treated for neuritis or muscular rheumatism, or even undergo operation for supposed abdominal disorders. Therefore, when a physician encounters a patient with persistent root pain that is not typical of the usual thoracic and abdominal diseases, he should consider the possibility of an intraspinal tumor.

Craig[5] noted that 10 per cent of patients with root pain had undergone operation, either prior to or after their admission to the Mayo Clinic, for some supposedly thoracic or abdominal lesion. This fact emphasizes the importance of recognizing the symptoms within the first cycle. The presence of persistent root pain aggravated by coughing, sneezing, stooping or lifting suggests further that the tumor is movable. It is during this cycle that roentgenographic examination with radiopaque oil is of inestimable value, since often diversion of the flow of the oil as seen under the roentgenoscope reveals a tumor before it is large enough to produce symptoms of compression of the spinal cord.[6] It must be remembered, however, that whereas pain is one of the early symptoms of many intraspinal lesions, tumors that are fixed and not movable will grow and compress the cord without producing root pain.

The symptoms that develop in the *second cycle* differ from those in the first in that neurologic evidence of compression of the spinal cord becomes manifest. The symptoms may develop simultaneously with the pain, or they may develop painlessly. If the tumor is situated anterolateral to the spinal cord, the symptoms will progress and simulate the classic Brown-Séquard syndrome, with impairment of motor, positional and tactile sensation on the same side as that of the tumor, with contralateral loss of pain and temperature sensation. If, however, the tumor is situated in the mid-dorsal position of the spinal canal, disturbances of the tactile, joint and vibratory senses will be elicited before impairment of motor function becomes obvious The reverse may be true if the tumor is situated anterior to the cord. It is apparent that loss of motor or sensory function will be gradual and will increase in proportion to the direct pressure on the cord. Often months or years pass before all functions of the cord are lost below the level of the tumor.

Vesical and rectal functions are rarely disturbed during the second cycle unless the tumor is intramedullary, in which case obstipation and retention of urine may be among the first symptoms

Tumor masses situated within the spinal canal that are rounded and circumscribed and cause indentations in the substance of the cord produce sharply defined levels of sensory and motor impairment However, the upper levels of such impairment are less sharply defined when produced by intramedullary tumors than when produced by extramedullary tumors Then, too, the sensory loss may be greater in the cord segments affected by an intramedullary tumor than it is below the level of the lesion

Tumors originating below the conus medullaris from nerve roots, blood vessels, meninges and the filum terminale invariably produce the classic symptom of pain Reflexes are decreased or lost in their activity, with an accompanying loss of motor power. Loss of vesical and rectal function develops simultaneously with loss of motor function.

Neurofibromas of the sacral nerves and chordomas of the sacrum produce localized pain and dysfunction of the bladder and rectum before saddle anesthesia becomes a complaint

The *third cycle* is characterized by symptoms that result from transection of the spinal cord The tumor at this stage has grown to such a size as to compress the spinal cord to a mere ribbon, thus interrupting all normal functions of the cord below the level of the lesion

Intramedullary tumors rarely produce pain, though local tenderness has been elicited. The symptoms begin with the second cycle and progress into the third cycle.

DIFFERENTIAL DIAGNOSIS

The symptoms of intraspinal metastatic lesions may be the same as those of benign tumors, except that the progress of a malignant growth is more rapid than that of a benign tumor. Carcinomas of the breast and the prostate gland metastasize more frequently to the spinal canal than do other malignant lesions of the thorax and abdomen. It must not be forgotten that a primary carcinoma of the breast may have been removed many years before metastasis appears within the spinal canal. However, carcinoma of the prostate gland may have produced metastatic lesions in the spinal canal before giving rise to retention of urine. Therefore, rectal examination should be made routinely to determine the presence or absence of a prostatic growth or a growth within the hollow of the sacrum.

The symptoms of meningomyelitis may resemble those of an intramedullary tumor, although there is often a history of antecedent infection. Neurologic examination discloses that the upper level of anesthesia is indistinct but that all qualities of sensation are equally affected.

Compression of the cord does occur in Pott's disease of the spinal column, as it does in extradural abscess of the spinal column.[7] A somewhat infrequent cause of compression is chronic hypertrophic osteoarthritis of the spinal column.[8] Spondylolisthesis, a slipping forward of the fifth lumbar vertebra on the sacrum, may result in injury to the cauda equina. Occasionally a case of Paget's disease is encountered in which the spinal cord shows evidence of compression.

In cases of subacute combined degeneration of the spinal cord the lesion, although progressive, is usually painless and diffuse. The diagnosis of tabes dorsalis is sometimes erroneously made, when the real cause of the symptoms is a tumor of the spinal cord or the cauda equina. It may be difficult to distinguish syringomyelia from intramedullary tumor. However, in the presence of the former the characteris
waistcoat type of sensory dist
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temperature fibers, usually
ing the correct diagnosis. If a
cord is associated with syrin
nostic difficulties may be ins

Although multiple sclerosis
transverse lesion of the cord.

patient, the absence of pain and the presence of cerebral signs, such as tremor, scanning speech, nystagmus, optic atrophy and ocular palsy, are sufficient to distinguish the lesions from tumor. The history of remissions of the symptoms of multiple sclerosis is of value in achieving a sound differential diagnosis.

EXAMINATION

Since the symptoms develop in a characteristically progressive manner, it is extremely important to take a thorough history. A searching general examination, including roentgenograms of the spinal column[9] at the level of root pain, is likewise necessary to determine the presence or absence of coexisting diseases. Before an exploratory laparotomy for pain is advised, a careful neurologic examination should be made. The information elicited by a detailed testing of reflexes, muscular strength, muscular tonus, sensory acuity, gait, coordination and balance will often reveal signs of compression of the spinal cord that the patient has failed to recognize. It is important to rule out the possibility of other neurologic lesions, such as the scleroses, the dystrophies, myelitis and neuritis.

Spinal Puncture.—Examination of the spinal fluid is of inestimable value in furnishing information concerning the physical and hydrodynamic properties and the chemical reactions of the spinal fluid. The puncture usually is performed at the fourth lumbar interspace and, before any of the fluid is removed, the intraspinal pressure is taken by Ayer's water manometer,[10] which should register approximately 12 to 15 cm. of water. As soon as this has been ascertained, Queckenstedt's test is made.[9] This consists in reading and studying the rate of rise of the cerebrospinal fluid in the manometer after compression of both internal jugular veins. Sudden rise and rapid fall of the fluid on compression of both internal jugular veins will indicate the free flow of cerebrospinal fluid in the subarachnoid space. Slow rise and fall of cerebrospinal fluid, or its failure to rise on compression of the jugular veins, will suggest partial or complete intraspinal block. A "dry tap" at the fourth lumbar interspace suggests that the needle has failed to enter the spinal canal, that cerebrospinal fluid is absent or that the needle has entered a tumor situated opposite the puncture. This suggests that other attempts should be made at higher or lower levels. If spinal block is not encountered, as, for example, in the second or third lumbar interspace, it is wise to attempt an additional puncture at the fifth lumbar interspace, since one may then be able to determine whether spinal block exists between the two punctures. Occasionally, cisternal puncture in conjunction with lumbar puncture supplies sufficient information concerning intraspinal pressure to warrant the procedure. Spinal puncture is not particularly difficult or painful and can readily be made less painful by the preliminary use of morphine. Headache occasionally follows a puncture but usually can be alleviated by hospitalization and by requiring the patient to lie flat in bed for twenty-four hours.

Spinal block, if due to tumor, frequently causes increase in the globulin content of the cerebrospinal fluid below the tumor.[21c] The fluid may be xanthochromic (Froin's syndrome[12]). In a few instances the fluid above the tumor has been xanthochromic. The cell count is usually normal but may be increased if the tumor is situated in the spinal canal below the conus. Blood is rarely demonstrated in the spinal fluid unless veins are injured or a tumor has been punctured.

The presence of partial or total block is not pathognomonic of intraspinal tumor, since previous attacks of meningitis, acute myelitis, injuries to the vertebrae or deformities of the spinal column are all capable of interfering with free flow of the cerebrospinal fluid. But it is apparent that the presence of block is extremely valuable when it is demonstrated in conjunction with the history of root pain and in the absence of a history of meningitis, acute myelitis or trauma.

Roentgenographic Examination.—In cases of root pain and in those in which the history is suggestive of tumor of the spinal canal, anteroposterior and lateral roentgenograms should be made. Camp, Shugrue and I have demonstrated[6a] that there is often roentgenographic evidence to be found in cases of intraspinal tumor. Psammomas may contain sufficient calcium to cast roentgenographic shadows. They are capable of producing erosion of the pedicles and laminae. Neurofibromas may erode the pedicles and cause further destruction of the transverse processes, laminae and bodies by growing through the intervertebral foramens. Although the tumors are situated opposite the thoracic vertebrae, they may erode the ribs and cast intrathoracic shadows. Large ependymal cell gliomas of the filum terminale are capable of producing erosion of the bodies of the vertebrae on each side of the intravertebral discs and the median raphe, besides eroding the laminae and pedicles on their dorsal and lateral aspects. Hemangiomas have a tendency to produce proliferations of bone, which result in thickening of the spines and laminae. Angiomas of the vertebrae produce characteristic trabeculations, with punched out areas. Hemangioendotheliomas situated extradurally likewise produce circumscribed erosions of the laminae, pedicles and vertebrae. Chordomas present characteristic destructive changes of the sacrum, the appearance of which is diagnostic. Proliferative changes of the vertebrae, pedicles, laminae and spines resulting in compression of the nerve roots and the spinal cord produce symptoms similar to those produced by intraspinal tumors. Fibrochondromas and foreign body giant cell tumors are roentgenographically recognizable.

Radiopaque Oils. Roentgenographic studies with either pantopaque or lipiodol are resorted to only when an intraspinal tumor is suspected to exist and when there are insufficient neurologic data to enable one to make a definite diagnosis or to determine the exact level of the lesion.[13] After 6 cc. of the radiopaque oil has been injected through a spinal puncture needle into the lumbar segment of the spinal canal, the patient is placed in the prone position on the roentgen table. The roentgenologist proceeds with his examination by tilting the table first in one direction and then in the other, in order that he may observe the flow of the oil within the arachnoid space. If the tumor blocks the spinal canal, the oil will be seen to form a crescentric shadow around the lower border of the tumor. If the tumor is small, the flow of oil will be diverted around the mass. If the tumor is situated within the spinal cord, the column of opaque oil will be seen to divide and flow on each side of the spinal cord until it meets the obstruction.

In selecting radiopaque oils for roentgenographic studies it is safer to use the heavier oils in order to avoid ascent of oil into the cisternae and into the ventricles of the brain. Upon completion of the roentgenoscopic study, roentgenograms should be made to confirm the roentgenoscopic observations. The oil should then be removed through the same spinal puncture needle, since cases have been reported in which it apparently gave rise to arachnoiditis and radiculitis.

SURGICAL CONSIDERATION OF THE VARIOUS TUMOR GROUPS AND OTHER INTRASPINAL LESIONS

A review of our series of intraspinal tumors at the Mayo Clinic showed that 29 per cent were neurofibromas, 25 per cent meningiomas, 8.5 per cent hemangioendotheliomas, 6 per cent miscellaneous extramedullary tumors, 6 per cent ependymomas that developed in the filum terminale, 11.5 per cent intramedullary tumors, 10 per cent sarcomas and 4 per cent chordomas. I have rarely explored a primary sarcoma or a metastatic carcinoma of the vertebrae. However, I have included in the sarcoma group the lymphosarcomas and those tumors in which malignant changes developed in what had been a benign tumor. Patients who underwent operation for protruded discs are not included in the study of those who had tumors.

Neurofibromas.—Neurofibromas may arise from the nerve roots within the dura, from the roots as they penetrate the dura or from the peripheral nerves just lateral to the dura. These lesions may be situated wholly within the spinal canal, may protrude into the intervertebral foramen or may present the typical dumbbell appearance,[14] one portion being within the spinal canal and the other beyond the intervertebral foramen. Neurofibromas situated in the spinal canal, even though they have eroded the bone around the intervertebral foramen, usually can be removed during a one stage operation. Those which are dumbbell shaped and situated in the cervical region are more effectively removed through two separate incisions. The extraspinal portion of such a tumor is removed first through a lateral cervical incision. This is followed by laminectomy, frequently hemilaminectomy, through however, that the blood supply of the spinal cord itself or of the nerve roots must not be injured. Roentgen treatment has not proved particularly effective in reducing the size of these tumors.

Chordomas.—Chordomas originate from the notochord. Although their sites of predilection are the sacrum[11,20] and the clivus blumenbachii, they may originate in other portions of the spinal column.[22,24] These tumors of the spinal column erode and invade the bony structure and fill the spinal canal, producing compression and destruction of the nerve roots. They may involve the spinal cord. They are primary malignant tumors, but, since their growth is slow and is accompanied by pain, the surgeon is frequently justified in attempting radical removal. Since many are situated in the sacrum, they produce an explosive type of enlargement, that is, erosion with an invasion of the bone and elevation of isolated fragments of bone on the periphery of the tumor. After radical resection of these tumors, roentgen therapy appears to offer additional relief in controlling the growth of the tumor and retarding the process of recurrence.

Lesions of Bone That Produce Compression of the Spinal Cord.—Hemangiomas of the vertebrae result in osteoporosis and flattening of the body of the vertebra with compression of the spinal cord. Occasionally, unilateral laminectomy acting as decompression offers some relief, but if such a procedure is employed a cancellous bone graft should be placed over the lamina along the spines opposite to the unilateral laminectomy.

Neurologic symptoms accompanying tuberculous involvement in the body of the vertebrae are usually relieved by placing the patient in hyperextension on a specially adapted frame. As the symptoms subside, the orthopedic surgeon usually inserts a bone graft as an additional support to prevent collapse of the body of the vertebrae. However, if the neurologic symptoms fail to improve after hyperextension, the surgeon is justified in carrying out hemilaminectomy for decompressive purposes. Usually there is found an increased amount of granulation tissue within the extradural fat. Although removal of such tissue may be justifiable, extreme care should be taken to avoid an injury to the dura, since the dura acts as a barrier to the invading tubercle bacilli. Spinal fusion is performed at a later date.

Foreign-Body Giant Cell Tumors.—These may be recognized by roentgenographic observation. Since these lesions are benign, they lend themselves to surgical treatment, which consists of laminectomy and removal by curet of the contents within the cystic cavity. This, in turn, relieves pressure on the meninges and the spinal cord.

Myelomas.—At the onset, spinal myelomas may be single or multiple. When a single myeloma is encountered, the surgeon is tempted to try radical removal in order to decompress the spinal cord, but the procedure is rarely justifiable, since recurrence is sure to take place and other lesions soon follow. Roentgen therapy has proved of very little value.

Osteogenic Sarcomas.—Although usually single at the onset, osteogenic sarcomas of the spinal column will recur and metastasize. The temporary relief obtained by radical removal to decompress the spinal cord is only occasionally indicated.

Osteochondromas.—These may be benign at the onset but frequently become malignant; they originate in an intervertebral disc and the adjacent vertebrae. Growth of such a lesion into the spinal canal produces symptoms similar to those of any extradural tumor, a point that emphasizes the facts that early recognition is essential and that a radical operation should be considered even though it becomes necessary to reoperate when recurrence takes place.

Paget's Disease.—In a number of instances the flattening of the vertebrae resulting from this disease produces radiculitis and, occasionally, symptoms of compression of the spinal cord. Again, it is doubtful whether decompression of the spinal cord is indicated, since the relief obtained is but temporary.

Hypertrophic Arthritis and Osteitis.—If either of these disease processes extends into the spinal canal, the roots may become involved and the spinal cord may be compressed, with the resulting symptoms of transverse myelitis.[8] If it is possible to determine by neurologic and roentgenographic examination that the process is fairly well localized, and if it has been recognized in the early stages of the disease, it is possible to obtain satisfactory results by means of wide and extensive laminectomy over the involved portion of the spinal cord Occasionally it becomes necessary to unroof the nerve roots as they pass through the intervertebral foramina

Hodgkin's Disease, or Echinococcus Cysts.—These lesions may enter the spinal canal through an intervertebral foramen When they do so, they are found to be situated extradurally, producing symptoms referable to the spinal cord by extradural pressure. Usually these masses can be removed by routine laminectomy without opening the dura, just as a surgeon would remove an extradural neoplasm. If the lesion is recognized as that of Hodgkin's disease, there being other manifestations, it is wise to employ a course of high voltage roentgen therapy before resorting to laminectomy On the other hand, if the symptoms of paraplegia are pronounced, it may be unwise to defer laminectomy. In some instances the operation has been performed first and roentgen therapy employed postoperatively

Metastatic Lesions of the Spinal Column.—These produce symptoms similar to those of intraspinal tumors, except that they develop much more rapidly than do benign lesions. They occur at a later age than does the average intraspinal tumor, a fact that should make the surgeon extremely careful during examination to determine, if possible, the presence of a primary lesion Exploratory laminectomy is rarely indicated, since removal of one metastatic nodule accomplishes so little that it is scarcely worth while. Occasionally, an operation must be performed when no primary lesion has been located and when there is some doubt as to whether the lesion is malignant

Protruded Intervertebral Disc—In the last few years protruded intervertebral discs have received an unusual amount of attention These tumor-like masses can be recognized on roentgenologic examination of the spinal canal after introduction of radiopaque oil or air[23] The occurrence of these masses in patients suffering from chronic recurrent sciatica has led to exploratory laminectomy and removal of the masses, which were producing pressure on the nerve roots. The relief obtained from these newer surgical procedures in the treatment of chronic recurrent sciatica when physiotherapeutic measures have failed has more than justified their use. The lesions occur as the result of a tear of the annulus fibrosus and a rupture of the intervertebral disc, with expulsion of a portion or all of the nucleus pulposus. Although the condition had been recognized and occasionally treated for a number of years, its importance was not emphasized until the introduction of roentgenographic studies made with the aid of radiopaque oil. These tumor-like masses, the nuclei pulposi, are not neoplastic, even though they produce symptoms similar to those caused by intraspinal tumors.

After the lesion has been recognized by the aid of the clinical history, neurologic observations and roentgenographic studies, the protrusion can readily be removed after a unilateral subtotal laminectomy has been performed. The ligamentum flavum has frequently been ruptured and hypertrophy has taken place, so that it becomes necessary to remove the hypertrophied ligamentum flavum with the protruded disc The involved spinal root is found to be compressed by or stretched over the protruded portion of the nucleus pulposus. Removal consists in dissecting free the edematous root and retracting the dura toward the midline. The completely prolapsed nucleus pulposus then may be found to be lying free within the canal and can be removed without further dissection If the protrusion is incomplete it may be necessary to use a sharp knife or even a curet to remove the partially dislodged nucleus pulposus. The dura is not opened unless radiopaque oil has been used, in which event the oil should be thoroughly removed before the incision is closed There is usually a single protruded mass, but there may be more than one. The mass is usually situated lateral to the posterior longitudinal ligament. Occasionally it has been observed in the midline when the protrusion is situated at the lumbosacral junction When this occurs, transdural removal may be required Protrusions occur most frequently in the fourth lumbar and lumbosacral discs, but they may occur in any part of the spinal column The second most common site of occurrence is the lower cervical region.

The method of administering the anesthetic agent and the technic of performing laminectomy have become so standardized that it would appear unnecessary to review them. I should like, however, to reemphasize the importance of early diagnosis of intraspinal tumors, since so many of them are benign and are operable. Eighty per cent of these lesions are removable. Complete recovery can be obtained if they are removed before irreparable damage to the spinal cord has taken place.

SUMMARY

Intraspinal tumors are discussed from the surgical point of view, with strong emphasis on the vital importance of early and accurate diagnosis. The symptoms, differential diagnosis and various methods of diagnosis, including spinal puncture, are described. In a series of intraspinal tumors observed at the Mayo Clinic the incidence was as follows: neurofibromas, 29 per cent; meningiomas, 25 per cent; hemangioendotheliomas, 8.5 per cent; miscellaneous extramedullary tumors, 6 per cent; ependymomas developing in the filum terminale, 6 per cent; intramedullary tumors, 11.5 per cent; sarcomas, 10 per cent, and chordomas, 4 per cent.

RÉSUMÉ

L'auteur discute du point de vue chirurgical les tumeurs intraspinales, avec emphase sur l'importance vitale d'un diagnostic precoce et exact. Les symptômes, le diagnostic différentiel, les differentes méthodes de diagnostic et la ponction spinale sont décrits. Dans une série de tumeurs intra-spinales observées à la clinique de Mayo, l'occurence était ainsi: neurofibromes, 29% ; méningiomes, 25% ; hémangloéndotheliomes, 8,5%; différentes tumeurs extramédullaires, 6%; épendyomese developpant dans le filet terminal, 6%; tumeurs intramédullaires, 11% ; chordomes, 4%; sarcome, 10%.

RIASSUNTO

Discute dal punto di vista chirurgico i tumori del midollo spinale, sottolineando la necessita' di una diagnosi precoce e precisa. Descrive i sintomi, i diversi metodi diagnostici: passa in rassegna la diagnosi differenziale. La percentuale dei diversi tumori osservati nella Clinica di Mayo e' la seguente: neurofibromi 29% ; meningiomi 25%; emangioendoteliomi 8,5% ; tumori vari extramidollari 6% ; ependimomi sviluppati nel filo terminale 6% ; tumori intramidollari 11,5% ; sarcomi 10%; cordomi 4%.

RESUMEN

Se estudian los tumores intrarraquídeos desde el punto de vista quirúrgico destacando la importancia vital de un diagnóstico precoz y exacto. Se describen los síntomas, el diagnóstico diferencial y los varios métodos de diagnóstico, incluyendo la punción raquídea. En una serie de tumores intraraquídeos observados en la Clínica Mayo la frecuencia fué la siguiente: neurofibromas, 20 por ciento; meningiomas, 25 por ciento; hemangioendoteliomas, 8,5 por ciento; tumores extramedulares miscelaneos, 6 por ciento; ependiomomas que se desarrollan en el filum temporal, 6 por ciento; tumores intramedulares, 11.5 por ciento; sarcomas 10 por ciento; y cordomas, 4 por ciento.

ZUSAMMENFASSUNG

Geschwuelste des Wirbelkanals werden vom chirurgischen Standpunkt unter starker Betonung der entscheidenden Bedeutung einer fruehen und genauen Diagnose eroertert. Die Symptome, die Differentialdiagnose und verschiedene diagnostische Verfahren einschliesslich der Punktion des Wirbelkanals werden beschrieben. In einer Reihe von Wirbelkanalgeschuwuelsten, die in der Mayoklinik beobachtet wurden, war die Verteilung der Tumoren die folgende: Neurofibrome 29%, Meningiome 25%, Haemangioendotheliome 8,5%, verschiedene extramedullaere Geschwuelste 6%, im Filum terminale entstehende Ependymome 6%, intramedullaere Geschwuelste 11,5%, Sarkome 10% und Chordome 4%.

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To the investigator, no delight is equal to that which comes when Nature's curtain is drawn aside for a moment, however brief that moment may be —*Mackenzie*

The desire to take medicine is perhaps the greatest feature which distinguishes an from animals —*Osler*

Surgery of the Painful Kidney

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NEW YORK

AS PHYSICIANS and surgeons, it is our duty not only to heal the sick but to relieve human suffering. There is no pain more severe than that which accompanies certain types of renal disease. It therefore seems proper at this time to enumerate some of the renal ailments that are accompanied with pain and can be relieved by operative intervention.

Among these one must include hypoplastic kidney, nephralgia, nephroptosis with kinking of the ureter, calculus of the kidney and ureter, perinephritic abscess, hydronephrosis and traumatized kidney. Pain in greater or lesser degree accompanies each of these lesions, and all of them can be relieved by operation.

Attention should also be called to the fact that many patients with right-sided pain have been promptly operated upon for appendicitis, with the unfortunate result that pain was not relieved after this major procedure. In other cases the gallbladder has been removed or oöphorectomy performed for the relief of right-sided pain, with persistence of that pain —the lesion at fault ultimately having been found in the kidney or ureter on the right side. In 1929 the senior author of this paper and Dr. Francis P. Twinem called attention to mistakes in diagnosis that resulted in appendectomy or removal of the gallbladder or ovary without relief of the right-sided pain. Such cases have multiplied to a point at which it seems advisable once again to refer to this subject.

Hypoplastic Kidney.—A hypoplastic kidney is one whose embryonic development has been arrested, so that it is diminutive and also more or less rudimentary in form. The architecture of the parenchyma may be normal, with a small but normally formed pelvis and calyces and a normal ureter; or the medulla and pyramids may be lacking, so that there is only cortical substance, and the pelvis is of the hydronephrotic type. Microscopic examination in some cases reveals a small amount of normal kidney tissue; in others, rudimentary tubules and glomeruli. The ureter is patent and excretory function active, but the kidney is incapable of undergoing functional hypertrophy sufficient to sustain life should disease destroy its mate.

The function of the hypoplastic kidney will be found to be subnormal by the phenolsulfonphthalein test, although the excretion of indigo carmine and the ability to concentrate urea may be relatively normal. The diagnosis must, therefore, be based on roentgenographic study.

We have noted on many occasions that the presence of a hypoplastic kidney has resulted in ever-increasing pain until the patient reaches an age between 30 and 40 years, at which time the pain (which is aching rather than colicky) becomes so severe that he seeks medical relief, and removal of the hypoplastic kidney results in cure of the pain.

Case 1.—A. P. S., a white man 42 years old, was admitted to the hospital on Feb. 4, 1949, complaining chiefly of "pain in the stomach." He stated *that he had had recurrent attacks of abdominal* pain over a period of eighteen years—usually aching but sometimes griping, nonradiating, and occurring variously in all of the abdominal quadrants. An appendectomy had been performed in 1931 and an exploratory operation through a midline suprapubic incision in 1942. He was told that calculi had been removed from the lower portions of both ureters. Neither cystoscopic nor excretory urographic studies had been done at any time. He had adjusted himself to these episodes of pain and continued to work as a laborer. One month before admission he had a sudden onset of epigastric pain followed by nausea and vomiting, at which time a physician made a tentative diagnosis of "ulcer" and administered Sippy powder and a bland diet. He continued to have recurrent attacks of epigastric distress, nausea, vomiting and, just before admission, a severe chill.

From the Oswald Swinney Lowsley Foundation, Inc., of St. Clare's Hospital, New York.

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Physical examination showed a palpable but not enlarged or tender right kidney. The left kidney was not palpable, and the physical findings were otherwise within normal limits.

During the first ten days of hospitalization the patient was subjected to the following examinations, all of which gave negative results: gastric analysis; the Papanicolaou test of gastric washings, examination of the spinal fluid, including the colloidal gold curve, roentgenographic examination (chest, barium enema, gastrointestinal series, gallbladder series), sigmoidoscopic study; repeated examination of the stools for blood and parasites.

Excretory urograms showed a normal-appearing and normally functioning right kidney. On the left side there was delay in the appearance of the dye, with incomplete filling of the calyces and poor concentration of dye in all of the films, as well as nonvisualization of the renal pelvis and the ureter.

Urologic consultation was requested. Cystoscopic study on February 14 showed no abnormality of the urethra, bladder, trigone or ureteral orifices. Urine specimens from each side showed urea determinations of 3 Gm. per liter on the right and 2 Gm. per liter on the left. A few colonies of diphtheroid shaped gram-negative bacilli were recovered from the left side. Retrograde pyelograms showed a normal right kidney. The left kidney was small (11 by 5 cm), *in normal position, arrested* in rotation, with moderate dilatation of the pelvis (12 cc capacity) and loss of the calyceal architecture suggestive of chronic pyelonephritis (Fig. 1).

On February 18 the left kidney was explored and found to be *small, with persistent fetal lobulations* and a solitary cyst (4 5 by 2 cm.) in its midportion. Nephrectomy was done, and the patient was discharged [illegible]

The [illegible] of the kidney [illegible] is discharge, [illegible] of his symptoms and has returned to his occupation as a laborer in a sheet metal plant.

Nephralgia —For years it has been the custom of urologists to disregard complaints of pain in the region of the kidneys unless the patient's pyelogram shows some abnormality. We have found, however, that there are occasional patients who actually have nephralgia —namely, unexplained pain in the renal area, and that their pain is relieved by surgical *treatment*

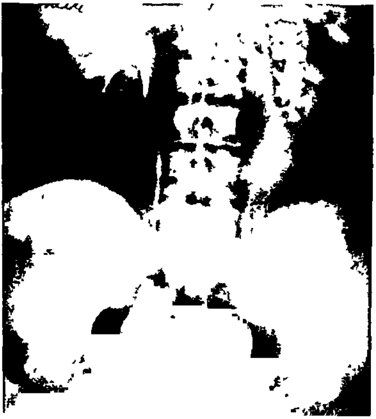

Fig 1 (Case 1) —Preoperative retrograde pyelogram showing normal right kidney and hypoplastic kidney with arrested rotation on left Patient, a 42 year old man, had recurrent attacks of *abdominal pain for eighteen years; completely relieved by removal of hypoplastic kidney.*

The diagnosis is quite simple. A patient of either sex may come in complaining of pain in the renal region. Such patients are often passed around among medical advisers and labeled "neurasthenics" because their pyelograms show no evidence of malformation or *hydronephrosis; but they present a rather* typical pattern and are easily recognized by physical examination. A neurasthenic patient will have pain wherever the examiner presses on his abdomen, but a patient with nephralgia will have pain (almost always unilateral) only over the affected kidney; he will not complain even at deep pressure in other parts of the abdomen. When the kidney is palpable and pressure is exerted directly upon it, the patient will respond promptly and actively. The senior author has observed several cases of this type.

CASE 2.—During the recent war, the senior author saw a Marine sergeant who had a wonderful war record, having taken part in landings on several of the South Pacific islands and never shirked his duty. He was seen by Capt. A. C. Abernathy of the U. S. Navy Medical Corps in Oak Knolls Naval Hospital, California, and referred to the author for diagnosis. He had typical symptoms of nephralgia: excruciating pain to deep pressure on

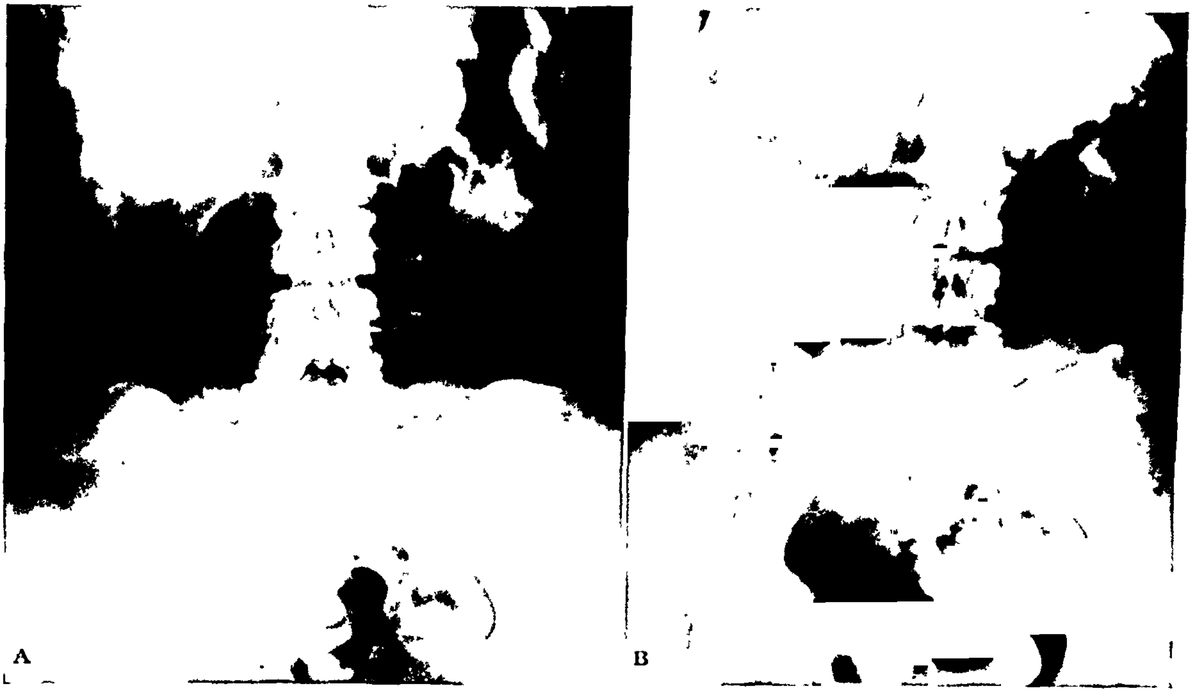

Fig. 2 (Case 3).—*A*, preoperative retrograde pyelogram showing no abnormality except bifid type of renal pelvis on left side. This 24-year old female had complete denervation of left kidney for nephralgia and, eighteen months later, denervation and decapsulation of right kidney for same reason. She has remained asymptomatic for twelve years. *B*, Excretory urogram twelve years after denervation of left kidney and eleven years after denervation and decapsulation of right kidney. Patient entirely asymptomatic.

the affected kidney, and no evidence of pain on pressure elsewhere. Captain Abernathy, following the author's advice, did a denervation of the affected kidney, and upon recovery from this operation the patient returned to the active and arduous duties of a Marine sergeant, with no further complaint of pain.

Case 3.—W. A., a 24-year-old white woman, was admitted to the hospital on Dec. 10, 1936, with a complaint of pain in the left flank and costovertebral region of one year's duration. She had been seen by numerous physicians and had had repeated cystoscopic examinations and both retrograde and excretory urographic studies. There were no other complaints. Her past and personal history was noncontributory except for an appendectomy in 1928.

Physical examination revealed the lower pole of the left kidney to be palpable and tender, and pressure in this area repeatedly caused exacerbation of the presenting symptom. Urinalysis, cystoscopic examination and microscopic examination of the urine from each kidney showed nothing unusual. The urea concentration of the two kidneys was equal. Except for a bifid type of renal pelvis on the left side, the retrograde pyeloureterograms were normal (Fig. 2*A*).

A diagnosis of nephralgia was made, and the patient was advised to have a denervation of the left kidney. This she refused. She was discharged.

Three weeks later she was readmitted, requesting operative relief of her pain. Examination disclosed no change since her prior admission, and on Jan. 6, 1937, a complete denervation of the left kidney was done. The kidney, renal pelvis and ureter appeared normal to gross examination, and the kidney was anchored in position by a Deming nephropexy *following* the denervation. The postoperative course was uneventful and she was discharged, asymptomatic, sixteen days later.

She was followed regularly in the outpatient department, and at no time was there a recurrence of pain in the left flank.

In November 1937 the patient contracted pulmonary tuberculosis and was admitted to a private sanatorium. Regular reports were received, and she had no symptoms referable to her left kidney and no evidence of tuberculosis of the urinary tract. However, in March 1938 there developed recurrent attacks of persistent pain in the right kidney. Urine smears and guinea pig inoculations gave negative results for acid-fast bacilli. Cystoscopic study and retrograde pyeloureterograms disclosed nothing abnormal. On physical examination, however, the right kidney was persistently tender, and pressure caused acute exacerbation of the pain

On June 24 the right kidney was explored The kidney, renal pelvis and ureter appeared grossly normal A complete denervation, followed by decapsulation, was done, and the kidney was anchored in position by a Deming type of nephropexy Seventeen days later the patient was discharged to a tuberculosis sanatorium

The cooperative attitude of the patient and the referring doctors has made possible an adequate follow up of this case An excretory urogram on Feb 28, 1949, eleven years after the second operation, revealed a normal urinary tract (Fig 2*B*) There has been no return of the pain in either kidney region

Nephroptosis with Kinking of the Ureter — Nephroptosis is a pathologic condition commonly met with by urologists Pain is the most prominent complaint This may be merely a feeling of weight or a dragging sensation, or it may occur in the form of a more or less constant dull ache or of acute colicky attacks It is remarkable how infrequently colic results from the dropping of the kidney However, if there is a ureteral kink interfering with free urinary drainage and causing stasis, recurrent attacks of colicky pain will result, which are quite characteristic and can be cured only by operation

The transient nature of ureteral kinks occurring with nephroptosis has often been noted Not all of them produce pain, and it is our impression that they are of slight clinical importance unless there is evidence that they cause obstruction and renal stasis, with or without infection

A delayed pyelogram or serial pyelographic study is of great value in demonstrating ureteral kinks and other obstructive factors in nephroptosis, and also in determining whether they interfere with urinary drainage If so, surgical fixation of the kidney is usually indicated

Case 4 —F F, a 41 year old white woman, was admitted to the hospital on April 12, 1949, complaining of recurrent attacks of abdominal pain during "all of her adult life" She had always been somewhat anemic, she had had numerous infections

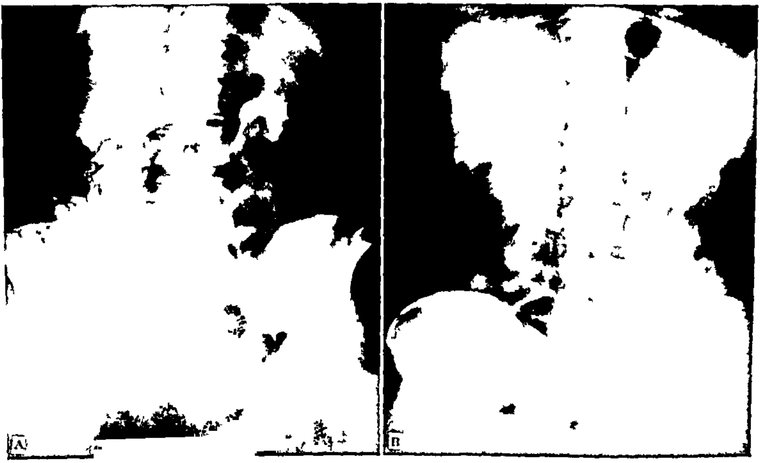

Fig 3 (Case 4) — *A* preoperative retrograde pyeloureterogram (erect posture) Shows ptosis of right kidney with definite kink near the ureteropelvic junction A Lowsley ribbon gut nephropexy relieved this patient's symptoms entirely *B* excretory urogram (upright film) one month after Lowsley nephropexy Shows right kidney in normal position and ureter straight, no evidence of obstruction

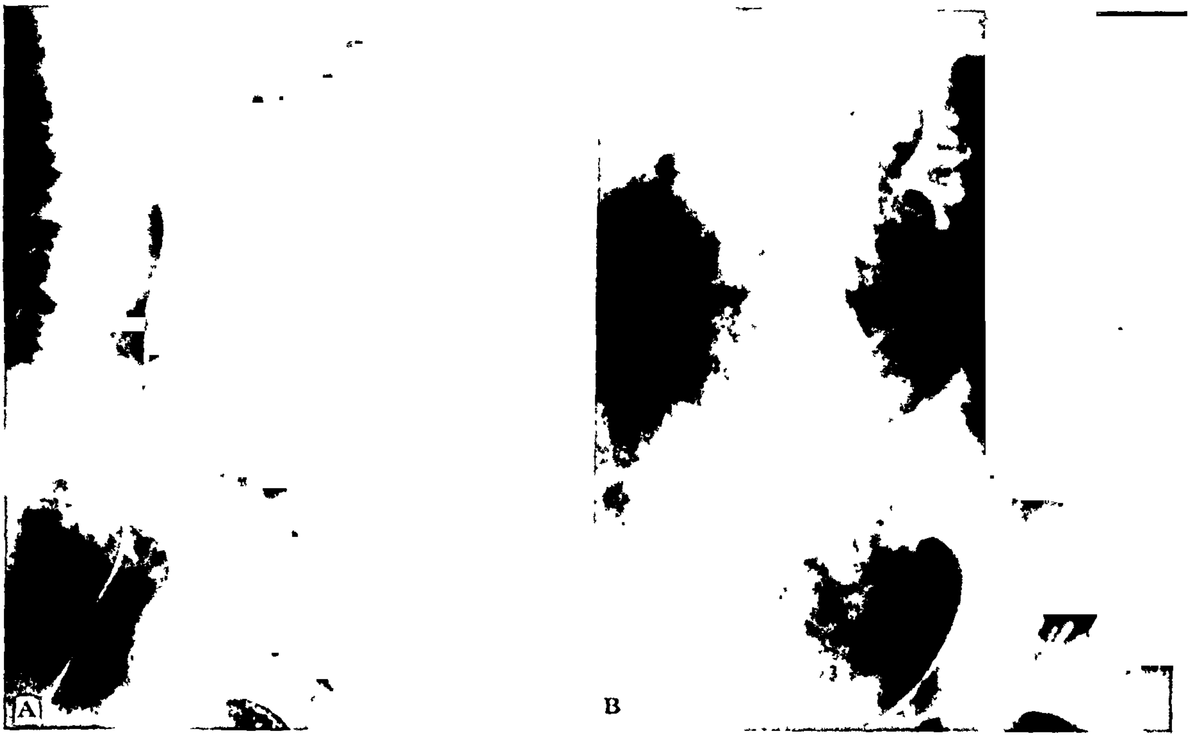

Fig. 4 (Case 5).—*A*, preoperative oblique film with roentgen-opaque catheter in position, showing density in region of ureteropelvic junction. *B*, preoperative retrograde pyelogram showing stone lodged in the ureteropelvic junction.

of the upper respiratory tract, three cesarean sections and, in 1946, a supravaginal hysterectomy because of menorrhagia. For the past three years there had been increasingly severe attacks of vague abdominal pain over the right flank and lower abdominal quadrant; and with these she had noted frequency and urgency of urination and several times had passed mucus and bright red blood clots.

The laboratory data were all within normal limits.

Bilateral pyeloureterograms were normal except for the following observations: The right kidney dropped for a distance of 7 cm. in the erect posture, and there was a definite kink near the ureteropelvic junction (Fig. 3*A*); the pelvis and calyces were enlarged; and the one-hour delayed film showed retention of a slight amount of dye in the calyces.

A diagnosis of right nephroptosis with kinking of the ureter and delayed emptying of the renal pelvis was made.

On April 15 a right nephropexy by the Lowsley ribbon-gut method was performed with spinal anesthesia.

Excretory urograms one month after operation showed the right kidney to be firmly fixed in position, with no evidence of descent in the upright film (Fig. 3*B*, b). The function was bilaterally normal. The calyces of the right kidney had returned to normal size, and there was no evidence of dye in the delayed film. The patient was entirely asymptomatic.

Renal and Ureteral Calculi.—Pain due to the presence and passage of a calculus is so characteristic that there is no need here to point out its various manifestations. A small calculus that engages itself in the upper portion of the ureter, or anywhere in the course of the duct, may cause more pain and distress than a large staghorn stone that fills practically the entire kidney. This pain—one of the most agonizing of all pains suffered by man—is due to the back pressure of urine, with swelling of the kidney within its fibrous capsule.

Because the majority of renal stones are located in the renal pelvis or the calyces, many surgeons prefer to remove most of them through a pyelotomy incision. It has become our practice, however, to do a nephrotomy in most cases, for two reasons: *(1)* the efficiency of the fat-and-ribbon-gut method of repairing kidney wounds and *(2)* the frequently bad results obtained from pyelotomy, due to postoperative stricture with subsequent loss of the kidney.

CASE 5.—E. V., a 52-year-old housewife, was admitted to the Surgical Service of a neighboring hospital on July 26, 1949, complaining of pain in the left flank with nausea, vomiting and constipation of thirty-six hours' duration. The pain was colicky and radiated to the left inguinal region. She had had no bowel movement since its onset. There had been no chills or fever, no frequency or urgency of urination, and no dysuria, gross hematuria or pyuria.

She stated that similar attacks had occurred at intervals ranging from a few weeks to three or four months over a period of five years. The attacks usually lasted from a few hours to one or two days and had been treated by sedation. The predominant symptom in these attacks was pain originating in the left flank and radiating anteriorly to the left lower quadrant of the abdomen, accompanied by severe nausea and vomiting and followed, usually, by constipation. Four years before admission, a left inguinal herniorrhaphy and uterine suspension had been performed.

The only pertinent physical observations were tenderness over the left flank and left upper abdominal quadrant, and tenderness but not enlargement of the left kidney. The complete blood count was within normal limits. Microscopic examination of the urine showed 1 to 2 red blood cells per high-power field. The urea nitrogen content of the blood was 12 mg. per hundred cubic centimeters, and the values for blood calcium and inorganic phosphates were within normal limits.

During the course of barium enema studies, a calcific density 1 by 1.5 cm. was noted in the region of the left renal pelvis. On August 4 urologic consultation was requested. Retrograde pyelograms, including oblique films with the roentgen-opaque catheter in position, revealed this density to be a calculus at the ureteropelvic junction (Figs. 4, *A* and *B*). The patient was transferred to the Urological Service, and a left nephrolithotomy was done on August 5.

The postoperative course was uneventful, and the patient was discharged on the eleventh day. Analysis of the stone showed it to be composed largely of calcium phosphate, and an acid ash diet was ordered to minimize the chances of recurrence.

Since her discharge, she has been entirely free of her presenting symptoms, including the constipation. A follow-up pyelogram two months after the operation showed a normal left renal pelvis, calyces and ureter (Fig. 5).

Perinephritic Abscess.—Perinephritic abscess is usually accompanied with a considerable amount of pain in the renal region and with fever, and is detected by the presence of a mass, a suggestive history and roentgenographic signs. However, pain and fever are not always present. We have observed cases in which neither of these symptoms existed, though a considerable mass was present and progressively increased in size. The presence or absence of pain and fever is often determined by the type of infecting organism. Staphylococcus aureus is the causative agent in the majority of cases in which the perinephritic abscess is secondary to a primary focus in the renal cortex or to some superficial pyogenic focus; but when the perinephritic abscess is associated with cortical abscesses due to ascending infection, colon bacilli, Bacillus proteus, Bacillus pyocyaneus and Aerobacter aerogenes are usually found in both the pus and the urine.

The plain roentgenogram is frequently a valuable diagnostic aid when correlated with the history and clinical course. Suggestive

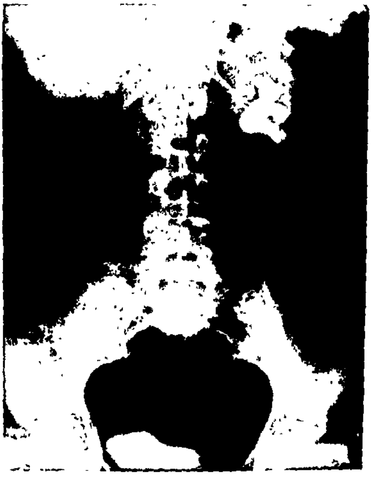

FIG. 5 (Case 5).—Postoperative pyelogram two months after removal of calculus. Renal pelvis and calyces normal.

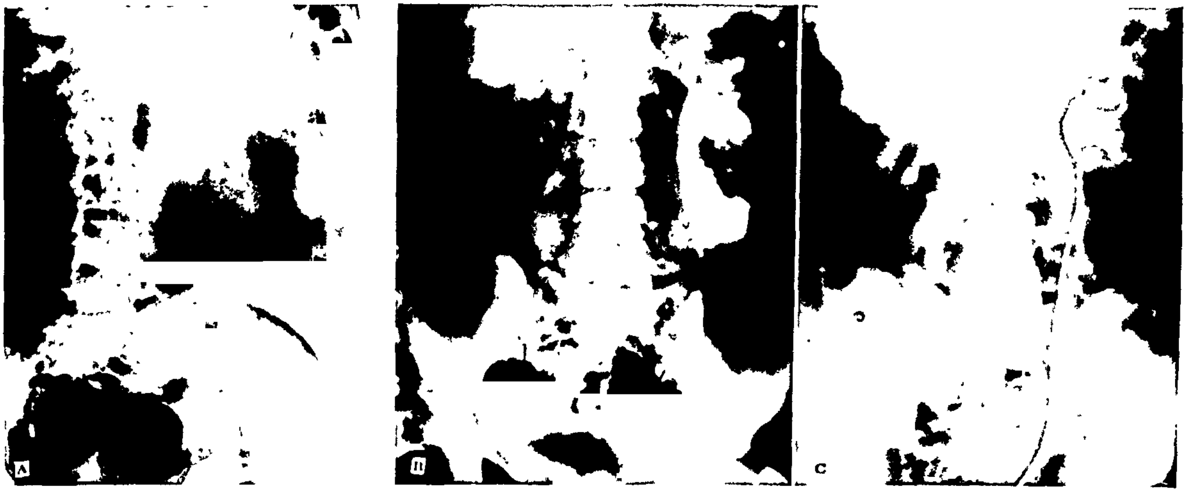

Fig. 6 (Case 6).—*A*, preoperative excretory urogram (oblique view). Note area of increased density in left upper abdomen, with obliteration of the psoas muscle shadow. The moderately hydronephrotic left kidney is displaced superiorly and its lower pole rotated laterally by the underlying mass, a large perinephritic abscess. This was evacuated and drained, with complete recovery. *B*, retrograde pyelogram eight days after operation. Shows return of left kidney to normal position. Moderate hydronephrosis still present. There is extravasation of contrast solution from the ureteropelvic junction into the perirenal space. *C*, retrograde pyeloureterogram seven months after operation. Pelvis and calyces normal in size and shape. No obstruction to drainage present.

features are obscuration of the shadow of the psoas margin on the affected side (a practically constant sign), effacement of the kidney shadow, and scoliosis of the lumbar portion of the spine, which occurs late.

Case 6.—C. S. R., a 59-year-old white woman, was seen in consultation by the senior author at a neighboring town on Feb. 22, 1949. She complained of frequency, urgency, nocturia, and some burning on urination for five months. Six weeks previously, cystoscopic and retrograde pyelographic studies had been done. Immediately thereafter severe pain developed in the left flank and costovertebral angle. This pain had not formerly been present and was associated with nausea, vomiting, fever and severe chill. She was given combined sulfa drug therapy. There was immediate improvement in her symptoms, but she continued to have generalized soreness in the left upper quadrant of the abdomen and flank, with malaise, anorexia, and progressive loss of weight. Her temperature fluctuated between 97 and 100 F. There had been no gross hematuria or pyuria.

Immediate hospitalization was advised by the senior author, and she was admitted to the hospital on February 22 with a tentative diagnosis of left perinephritic abscess.

Physical examination showed evidence of recent loss in weight and a general appearance of chronic illness. The lung fields were clear except for elevation and fixation of the left diaphragm. There was marked tenderness over the entire left side of the abdomen, most severe in the upper quadrant and over the flank. An exquisitely tender mass was palpable in the left upper quadrant and extending beneath the costal margin.

Laboratory examinations showed the following pertinent data: hemoglobin, 10.5 Gm.; erythrocytes 3,500,000 and leukocytes 22,000 per cubic millimeter of blood. The differential count showed lymphocytes 7 per cent, monocytes 2 per cent, eosinophils 1 per cent, polymorphonuclears 52 per cent and band forms 38 per cent. The value for urea nitrogen in the blood was 20 mg. per hundred cubic centimeters. Urinalysis showed a trace of albumin, and microscopic examination of the urine revealed 5 red and 25 white cells per high power field.

The patient was given two transfusions of whole blood, 500 cc. each. A roentgenogram of the chest revealed elevation of the left side of the diaphragm, with atelectasis and slight pleural effusion at the base of the left lower pulmonary lobe. Excretory urograms showed a normal-appearing right kidney and ureter. There was an area of increased density in the left upper quadrant of the abdomen with obliteration of the psoas muscle shadow (Fig. 6*A*). The ten-minute film showed prompt excretion of dye on the right side and delayed appearance of the dye on the left, with incomplete filling of the calyces and the renal pelvis. The left kidney was displaced superiorly, and the lower pole was rotated laterally by the underlying mass. There was moderate hydronephrosis. Oblique films confirmed these observations.

On February 23 the left flank was explored with the region under spinal anesthesia. A large retroperitoneal abscess was seen which extended superiorly beneath the diaphragm and inferiorly along the psoas muscle to the brim of the bony pelvis. The abscess cavity was evacuated and drained with Penrose and rubber tube drains. Examination disclosed moderate hydronephrosis of the left kidney and a perforation at the ureteropelvic junction.

Culture of the abscess contents showed Staph. aureus haemolyticus and A. aerogenes.

Postoperatively the patient was given another transfusion of 500 cc. of whole blood, and combined penicillin and streptomycin therapy was administered.

The postoperative course was marked by progressive improvement. On the eighth day a retrograde pyelogram (Fig. 6*B*) showed continued hydronephrosis, but the kidney had returned to its normal position. There was extravasation of the dye from the ureteropelvic junction into the perirenal space. On the twelfth day a No. 9 F whistle-tipped catheter was passed up the ureter into the pelvis and left in position. A follow-up pyelogram on the eighteenth day showed persistence of the hydronephrosis but no evidence of extravasation of the dye into the abscess cavity. The splinting catheter was removed on the forty-fourth day. At this time there was no evidence of drainage of urine from the abscess cavity, which was healing well. By June 11 (one hundred and seven days after the operation) the cavity had healed completely and the urine was entirely clear.

A pyeloureterogram taken seven months after the operation showed a return of the renal pelvis and calyces to normal size and configuration (Fig. 6*C*). There was not stricture at the ureteropelvic junction, and the five-minute delayed film showed complete emptying of the pelvis and the calyces.

Hydronephrosis.—The colicky pain of nephroptosis with kinking of the ureter has been described. It is closely allied to the pain of hydronephrosis, although hydronephrosis usually develops from a narrowing in the ureter rather than from a definite kink. A patient may suffer for years from aching pain due to partial obstruction of the ureter without the occurrence of any severe episode to impel him to seek medical aid at an early stage

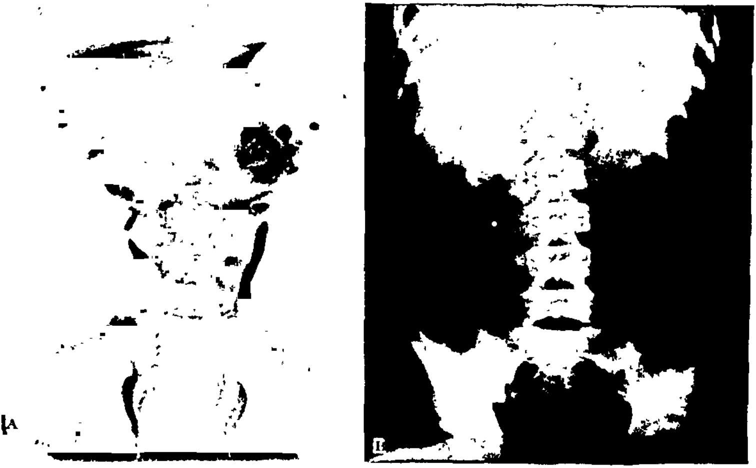

Fig. 7 (Case 7).—*A*, preoperative retrograde pyelogram. Shows marked stricture in upper portion of each ureter; also bilateral hydronephrosis. The 30 minute delayed film showed complete emptying of the lower ureters but no demonstrable drainage from either kidney. *B*, excretory urogram (forty-five minute film), six weeks after second operation. No evidence of stricture on right side; both ureters [illegible] freely. Note appearance of dye in left kidney, which had not previously been visualized in [illegible] gram.

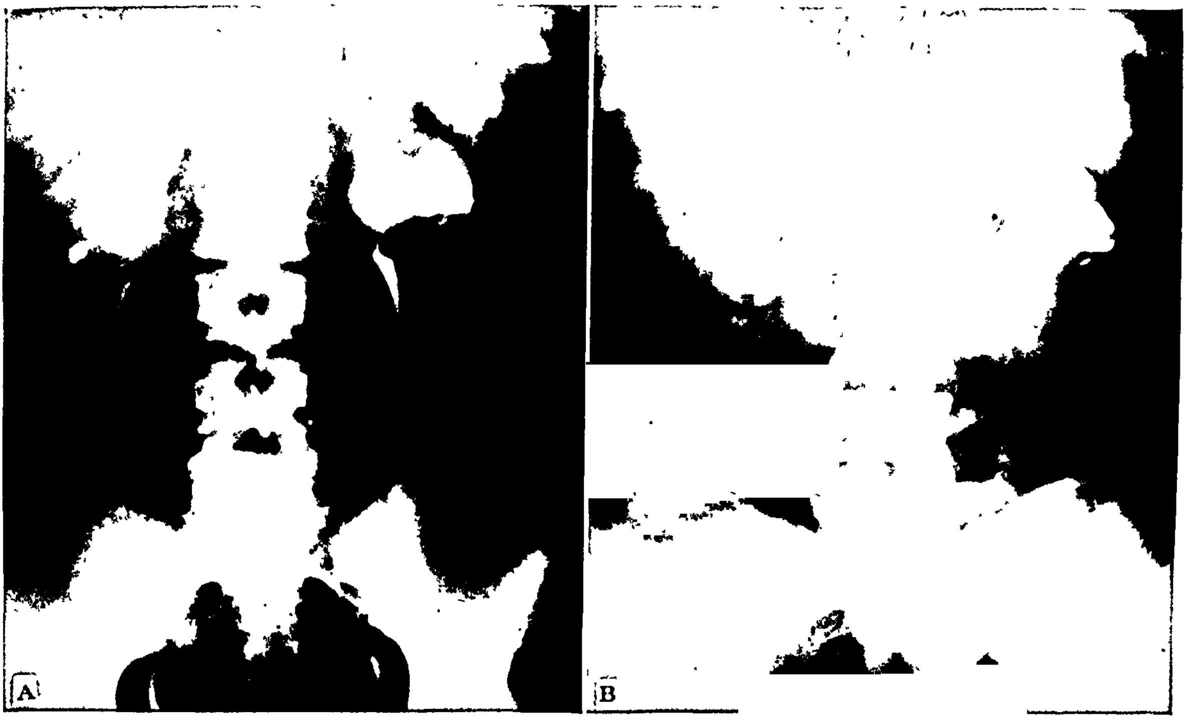

Fig. 8 (Case 7).—*A*, retrograde pyelogram twelve and one-half years after operation; shows continued but greatly decreased dilatation of both kidneys. No. 9-F catheters passed easily to both pelves. *B*, five-minute film shows complete emptying of the right pelvis. There is delayed emptying of the left pelvis, but this was complete in fifteen minutes.

Hydronephrosis may also develop from the presence of aberrant vessels at the ureteropelvic junction. A case of this sort is described:

Case 7.—J. M., a 10-year-old white boy, was admitted to the hospital on March 18, 1937, with a history of recurrent attacks of abdominal pain, nausea and vomiting over a period of four months, during which time he had been treated symptomatically for "colic" and "upset stomach." There had been no other symptoms.

Physical examination showed the abdomen to be protuberant but symmetric. The left upper quadrant was filled with a smooth, nontender mass which extended to the costal margin above and to the level of the umbilicus below. The right kidney was palpable and nontender, with its lower pole extending 5 cm. below the costal margin. The blood pressure in millimeters of mercury was 126 systolic and 96 diastolic.

Urinalysis showed a trace of albumin and occasional red and white blood cells. The value for urea nitrogen was 22 mg. per hundred cubic centimeters of blood; that for total phenolsulfonphthalein excretion, 14 per cent in three hours.

Excretory urograms showed marked enlargement of both kidneys. There was delayed excretion of dye from the right kidney, with poor concentration and retention of dye in the three-hour film. There was no evidence of dye from the left kidney in any of the films.

Cystoscopic study and a retrograde pyelogram (Fig. 7*A*) disclosed a definite obstruction at each ureteropelvic junction. The pelvis and calyces of the left kidney were greatly dilated, the dilatation on the left side being much more marked.

On March 19 the right kidney was explored with the patient under general anesthesia. A single vein was found to cross the ureter 1 inch (2.5 cm.) below the ureteropelvic junction and to elevate the ureter against the lower pole of the kidney, where it was further anchored by fibrous adhesions. The aberrant vessel was ligated and divided; the constricted portion of the ureter was excised and the duct reimplanted into the renal pelvis. The ureter was then placed in the normal position. A splinting ureteral catheter was inserted and brought out with the nephrostomy tube through the lower pole of the kidney, both tubes being anchored in place with ribbon gut placed through the capsule. A Deming type of nephropexy was done.

The postoperative course was uneventful. By the nineteenth day the value for phenolsulfonphthalein excretion had increased to 36 per cent. The level of blood urea nitrogen remained unchanged.

On May 6 the left kidney was explored with the patient under general anesthesia. A large extrarenal pelvis was found, with enlargement of the kidney but apparently with considerable normal cortex remaining. The ureter (which was small but without definite stricture) was bound to the lower pole of the kidney by an aberrant vein and a few fibrous bands. An incision was made in the lower pole, in the midline of its greater curvature. The renal pelvis contained 300 cc. of clear urine. The aberrant vein was ligated and divided. The ureter was then freed and replaced in its normal position. A No 9 F catheter was left in the ureter as a splint and brought out with the nephrostomy tube through an incision in the renal parenchyma, bleeding being controlled by fat anchored in place by ribbon-gut sutures through the capsule

Postoperatively the excretion of phenolsulfonphthalein increased to 54 per cent in three hours. The blood urea nitrogen decreased to a level of 15 mg. per hundred cubic centimeters. Excretory urograms (Fig. 7*B*) showed the right renal pelvis to have decreased in size. There was delayed but definite appearance of dye from the left kidney—the first time there had been sufficient concentration of dye on this side for roentgen visualization. Both ureters drained freely.

This patient has been followed regularly up to the time of writing. He is now 6 feet 2 inches (187.9 cm.) tall and weighs 185 pounds (83 9 Kg.). He recently completed law school and passed the state bar examinations. Retrograde pyelographic studies on Sept 9, 1949, twelve and one-half years after the operation (Fig 8, *A* and *B*), showed continued but greatly decreased dilatation of both renal pelves. However, No. 9 F catheters passed easily to the pelves without evidence of ureteral obstruction There was complete emptying of the right pelvis within five minutes and of the left within fifteen.

Traumatized Kidney—Pain accompanying trauma to the kidney may vary greatly in severity Usually traumatic injury to the kidney is extremely painful, both because of the edema and bleeding under the renal capsule and because of the muscular trauma suffered at the time of the accident

The resistance offered by the kidney to external violence appears to depend largely upon the strength of its fibrous capsule In experiments conducted by the senior author and Dr Joseph H Menning in 1941, it was found impossible to rupture the capsule of a dog's kidney by striking upon its surface with a blunt instrument, although various degrees of injury—from slight subcapsular hemorrhage to complete pulpefaction of the traumatized area —could be inflicted on the cortex, depending upon the amount of force exerted. When the capsule was opened after the injury brisk bleeding always occurred, and after severe injuries serious hemorrhage was noted However, the fibrous capsule may be digested by the ferments released by traumatism to the cortical substance, resulting in perinephritis, infiltration with urine and pus, and even complete destruction of the kidney. Examination of the dogs' kidneys at varying lengths of time after trauma of different degrees had been inflicted upon them revealed that in no case in which the capsule was opened and bleeding stopped by fat held in place by ribbon-gut sutures was a kidney destroyed.

The conservative thing to do in cases of trauma of the kidney is to explore the organ if the bleeding persists longer than twenty-four hours, because serious permanent damage will not result if the kidney is drained and the urinary stream diverted through a nephrostomy tube. On the other hand, if there is extravasation of urine—infected or otherwise—into the delicate tubules and glomeruli forming the cortex of the kidney, serious and possibly permanent damage of the organ results. In many cases there is also an increase in blood pressure. We have observed cases in which untreated trauma of the kidney resulted in elevation of blood pressure with accompanying distress, which was relieved by removal of the kidney. If an injured kidney is properly treated and extravasation of urine into the delicate renal structure is not allowed to persist too long, no such serious result will follow Therefore, in cases of trauma of the kidney it is our practice, when in doubt, to explore the organ at once, not hopefully to wait and operate only if the patient goes into shock; for when this has occurred it is too late to save the kidney in any sense of the word.

CASE 8.*—T. K., a boy aged 11, was sleigh-riding on Jan. 23, 1936, when he crashed into a tree and struck his left side and head He was taken to the hospital in an ambulance. There he was found to have pain in the region of the left kidney, with hematuria and slight shock.

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*Observed with Dr [illegible] H Kingery at St Agnes Hospital, White Plains N Y

Physical examination showed marked tenderness to deep palpation in the left costovertebral angle and anteriorly in the left upper abdominal quadrant. The urine contained microscopic blood. The value for hemoglobin was 61 per cent. Excretory urographic study showed a normal upper urinary tract, with no extravasation of dye about the left kidney.

On the following day his condition was improved. Slight tenderness persisted in the left costovertebral angle; the urine was less bloody; the value for hemoglobin was 60 per cent. On the second day there were greater distention, moderate abdominal rigidity, and more marked tenderness posteriorly. The patient vomited and his temperature rose slightly. The senior author was consulted and recommended exploratory operation.

On January 26 the operation was performed by the senior author and Dr. Kingery. The perirenal tissues were edematous. Upon exposure of the kidney, its capsule was seen to be distended by a blood clot which elevated it about an inch (2.5 cm.) above most of the cortex. The capsule was opened and the clots removed, which relieved the pressure generated under the capsule. The injury—a tear—was posterior to the midline. Examination of the peritoneum showed considerable dark fluid inside the parietal peritoneum. The peritoneum was opened and over a pint of extravasated blood removed. This had come from the lower part of the spleen, which also had been ruptured but fortunately had stopped bleeding. The peritoneum was drained with three Penrose drains and the kidney by two drains, one on each side. The wound was closed in layers and the patient given a transfusion of 500 cc. of whole blood.

He was discharged, cured, on the twentieth postoperative day, with the wound entirely healed.

When last seen, about five years after the operation, his urinary tract appeared to be normal, and he showed no bad effect from his experience.

SUMMARY AND CONCLUSIONS

A study of painful renal conditions is presented, with reports of 8 illustrative cases. The following conclusions are offered:

1. There are many conditions of the kidney that cause considerable pain but are completely cured by surgical intervention. Operation is successful or unsuccessful according to the nature of the pain-producing lesion. Among these lesions are renal hypoplasia, nephralgia without demonstrable pathologic change, nephroptosis with kinking of the ureter, perinephritic abscess, hydronephrosis, obstruction anywhere in the upper part of the urinary tract and trauma to the kidney.
2. It is especially important that the urinary tract be examined in patients who have persistent right-sided pain and have undergone appendectomy for its relief without success.

RÉSUMÉ ET CONCLUSIONS

L'etude des affections rénales douloureuses est accompagnée de rapports de 8 cas démonstratifs. Les conclusions suivantes sont présentées:

1. De nombreuses affections rénales existent, fort douloureuses, mais qui sont complètement guéries par l'intervention chirurgicale. L'opération réussit ou non d'après la nature de la lésion qui cause la douleur. Parmi ces lésions sont l'hyperplasie, la néphralgie, sans changements pathologiques évidents, la nephroptose avec uretère en anse, l'abcès périnéphrétique, l'hydronéphrose, l'obstruction, n'importe où qu'elle se produise dans le cours de la voie urinaire supérieure et la traumatisme rénal.
2. Il est particulièrement nécessaire d'examiner les voies urinaires des malades qui souffrent de douleurs persistantes du côté droit et ont subi à cet effet l'appendicectomie sans succès.

RIASSUNTO

Elenca le cause piu' comuni dei dolori renali, illustrando 8 casi sottoposti ad un'operazione. Da questa rassegna emergono le seguenti conclusioni:

1) I risultati delle operazioni sul rene dipendono dalla natura delle lesioni che provocano i dolori. Fra queste: iperplasia renale, nefralgia senza lesioni dimostrabili, nefroptosi con inginocchiamento dell'uretere, ascessi perirenali, idronefrosi, ostruzioni in qualsiasi parte della porzione superiore delle vie urinarie, traumi sul rene.

2) Particolare importanza assume l'esame delle vie urinarie nei soggetti operati inutilmente di appendectomia per dolori persistenti del fianco destro.

RESUMEN Y CONCLUSIONES

Se presenta un estudio de las afecciones renales dolorosas con informes sobre ocho casos ilustrativos, llegando a las siguientes conclusiones

1 Existen muchas afecciones renales que causan considerable dolor, pero que se curan completamente por medio de una intervención quirúrgica La operación tiene o no éxito, según la naturaleza de la lesión causante del dolor Entre estas lesiones figuran la hiperplasia renal, nefralgia sin cambios patológicos notables, nefroptosia con torsión del ureter, abscesos perinefríticos, hidronefrosis, obstrucción en cualquier área de la parte superior del tracto urinario y trauma del riñón

2 Es de suma importancia examinar el tracto urinario en aquellos pacientes que padezcan de dolor persistente en el lado derecho y que hayan sufrido una apendectomía sin resultados satisfactorios

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es wird ueber eine Untersuchung schmerzhafter Nierenzustaende an Hand von 8 erlaeuternden Faellen berichtet. Die Schlussfolgerungen sind

1 Es gibt viele Nierenzustaende, die erhebliche Schmerzen verursachen und durch chirurgischen Eingriff voellig geheilt werden koennen Der Erfolg der Operation haengt von der Natur der schmerzerzeugenden Stoerung ab Zu diesen Erkrankungen gehoeren Hyperplasie der Nieren, Nephralgie ohne nachweisliche pathologische Veraenderung, Nierensenkung mit Knickung des Harnleiters, perinephritischer Abszess, Hydronephrose, Obstruktion in der oberen Haelfte der Harnwege und Nierenverletzungen

2 Eine Untersuchung der Harnwege ist von besonderer Wichtigkeit in Faellen von Kranken, die unter staendigen rechtsseitigen Schmerzen leiden und eine Blinddarmoperation durchgemacht haben, ohne von ihren Schmerzen befreit zu werden

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The United States Chapter of the
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The Clinical Course in Thirty-Five Cases of Renal Neoplasm

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R. B. DUNHAM, M.D.
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THE frequency with which renal neoplasms occur in the general population has not been accurately determined Shaheen and his associates,[1] in 1944, reported 30 cases of malignant tumor of the kidney in a review of 5,100 autopsies Hale and his coworkers[2] in 1943 reported 54 cases of renal tumor in a review of 6,577 autopsies In our series the incidence is 0.58 per cent

The disease is more common in men than in women Shaheen[1] stated that renal tumors occur three times as frequently in men, and our cases lend support to his statement (Table 1) Of our patients 85.7 per cent were adults, and 73.3 per cent of these were men. In our total group of 35 cases, 71.4 per cent of the patients were men.

Our group of cases is too small to draw conclusions concerning the relative incidence in the white and colored races Only 8, or 22.9 per cent, of our patients were colored

Most authors are in agreement concerning age incidence, and our figures (Table 2) are in agreement with many of the reports in the literature Forty per cent of our patients were between the ages of 40 and 60 Twenty-eight and six-tenths per cent were over 60, and of the 28.6 per cent who were under 40, half were children with Wilms tumors In 21, or 60 per cent, of our cases the tumor was on the left The right kidney was involved in 14 (45 per cent) of the cases

In 13 cases (37.1 per cent) the tumors were hypernephromas (we use the term in its broadest meaning, to include adenocarcinomas occurring in the adult renal cortex) A discussion of the classification of renal neoplasms is beyond the scope of this paper.

Table 3 shows the incidence of the various types of tumor and the importance of the various symptoms In 8, or 22.9 per cent, of our cases the diagnosis was made by pyelographic study and not by study of tissue The tumors were *probably hypernephromas*, and if added to the 13 proved cases will raise the number of hypernephromas to 21, or 60 per cent of the group studied. In the remaining 14 cases there were 5 Wilms tumors (14.3 per cent); 5 intrapelvic tumors (14.3 per cent); 2 sarcomas (5.7 per cent): 1 benign adenoma (2.9 per cent) and 1 metastatic tumor of the left kidney from an advanced carcinoma of the right lung.

Among the most important aspects of any malignant disease are the early symptoms that cause the patient to seek medical attention. Most authors agree that gross hermaturia is the most important single symptom in cases of renal tumor. In our series hematuria occurred in 62.9 per cent of the total group, 40 per cent of the cases of Wilms tumor and 60 per cent of the cases of intrapelvic tumor In the cases of hypernephroma the incidence of gross hematuria was 76.9 per cent, but if we add to this the 87.5 per cent incidence in the group of 8 tumors diagnosed only by pyelographic study and considered to be hypernephromas, the incidence of gross hematuria associated with hypernephroma is raised to 81 per cent and is in agreement with the figures of Abeshouse and Weinberg,[3] reported in the *Archives of Surgery* in 1945 Pain occurred in 74.5 per cent of our cases In most of them it was not severe, but it was persistent enough to worry the patient and in some instances was the deciding factor in his seeking medical care. This was true especially in the 2 cases of sarcoma, the 1 case of benign neoplasm, the 1 case of metastatic tumor and some of the cases of intrapelvic tumor (Table 4). An easily palpable mass in the side occurred in both of the patients with sarcoma and in 4 of the 5 patients with Wilms tumor. In 5 (38.5 per cent) of the

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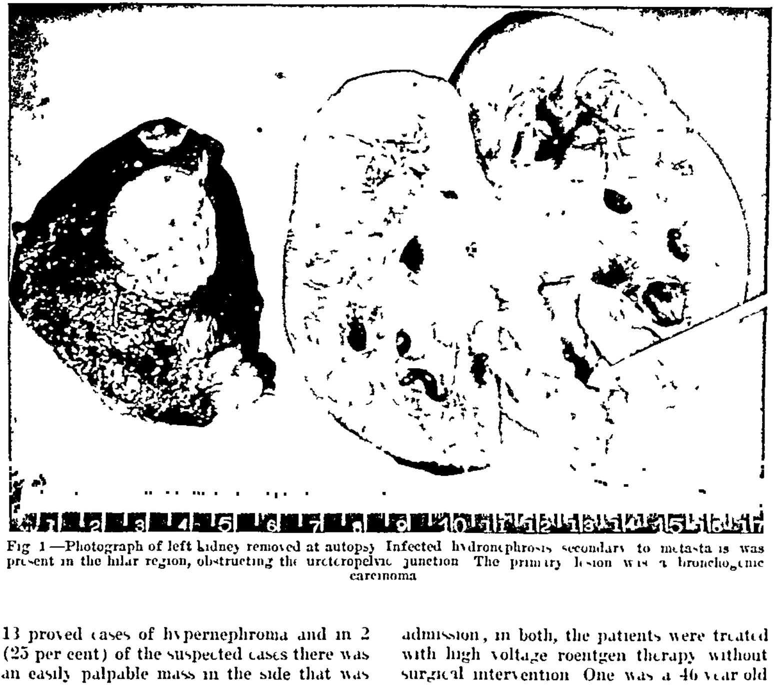

Fig 1.—Photograph of left kidney removed at autopsy. Infected hydronephrosis secondary to metastasis was present in the hilar region, obstructing the ureteropelvic junction. The primary lesion was a bronchogenic carcinoma.

13 proved cases of hypernephroma and in 2 (25 per cent) of the suspected cases there was an easily palpable mass in the side that was first noticed by the patient. A renal tumor large enough to be noticeable to the patient usually represents an advanced state of the disease, and the prognosis is poor. Of the patients with a palpable mass in the side, 63.6 per cent are now dead, as compared to 50 per cent of those with pain in the side and 42.1 per cent of those with gross hematuria. The symptoms of nausea, weakness and loss of weight occurred in some cases but have little diagnostic or prognostic significance.

Table 5 shows the relation of high voltage roentgen therapy to survival. In all cases the preoperative diagnosis was made by pyelographic studies. In most of the cases both excretory and retrograde pyelograms were employed, but in a few only one of these was used. In only 2 cases did we discover metastasis on admission; in both, the patients were treated with high voltage roentgen therapy without surgical intervention. One was a 46 year old man with a primary bronchogenic carcinoma and extensive metastasis including metastasis to the left kidney producing hydronephrosis with infection (Fig 1). This was treated with high voltage roentgen therapy, ureteral catheter drainage and chemotherapy. The patient died thirty-four days after admission. An autopsy was performed. The other was an 11 year-old Negro boy with a Wilms tumor that had been examined by biopsy, but not removed, in another hospital. He was treated with high voltage roentgen therapy and survived six months. A 65 year old woman with a suspected hypernephroma had marked hypertension. The diagnosis of renal tumor was made by excretory and retrograde pyelograms and a left perirenal aerogram. She refused all treatment and is living [illegible] after nine

Fig. 2.—Retrograde pyelogram showing a squamous cell carcinoma of the left renal pelvis.

months. This woman, as well as others in the group of 8 patients whose condition was diagnosed pyelographically and who were not operated upon, may have had a cyst rather than a neoplasm. One patient with squamous cell carcinoma of the renal pelvis (Fig. 2) had *marked secondary anemia on admission.* Nephrectomy was performed (Figs. 3 and 4) and high voltage roentgen therapy was given postoperatively. He survived five and one-half months. A 76-year-old-man was in poor general condition because of repeated cerebral vascular accidents. His family refused therapy for him, and he survived ten months. In 5 patients the tumor was associated with benign prostatic hypertrophy. Four of these underwent transurethral prostatic resections; 2 of them are now living and well after nephrectomy and postoperative roentgen therapy. The third was treated by high voltage roentgen therapy without nephrectomy and survived for only ten months. The fourth has not been followed. The fifth patient was treated by nephrectomy and high voltage roentgen therapy, but his prostate has not yet been treated. This patient is a 46-year-old Negro admitted because of hematuria and slight pain in the left side. Retrograde pyelographic studies revealed a neoplasm of the upper pole of the left kidney, and nephrectomy was performed. Since the tumor was small, the unopened kidney (Fig. 5) revealed little evidence of the neoplasm in its upper pole (Fig. 6). The microscopic diagnosis was renal cell carcinoma.

Two patients had a neoplasm of one kidney and calculous disease of the other. One

TABLE 1.—*Incidence of Renal Neoplasms by Race and Sex in a Study of 35 Cases*

Adults Over 24 Years of Age	White, Male		White, Female		Total White		Colored, Male		Colored, Female		Total Colored		Total	
	No. of cases	% of Total	No. of cases	% of Total	No. of cases	% of Total	No. of cases	% of Total	No. of cases	% of Total	No. of cases	% of Total	No. of cases	% of Total
Diagnosed by tissue study	14	40.0	3	8.6	17	48.6	3	8.6	2	5.7	5	14.3	22	62.9
Diagnosed by pyelograms tissue not studied....	5	14.3	2	5.7	7	20.0	0	0.0	1	2.9	1	2.9	8	22.9
Total of adult patients ..	19	54.3	5	14.3	24	68.6	3	8.6	3	8.6	6	17.1	30	85.7
Children under 12 years of age. All diagnosed by tissue examination. All were Wilms tumor.)	2	5.7	1	2.9	3	8.6	1	2.9	1	2.9	2	5.7	5	14.3
Totals for both adults and children	21	60.0	6	17.1	27	77.1	4	11.4	4	11.4	8	22.9	35	

TABLE 2 —*Incidence of Renal Neoplasms by Age in a Study of 35 Cases*

Age in years	No of cases	%	Type of neoplasm	No of each type
1–9	4	11.4	Wilms tumor	4
10–19	1	2.9	Wilms tumor	1
20–29	1	2.9	Perirenal Liposarcoma	1
30–39	4	11.4	Squamous cell carcinoma of renal pelvis Hypernephroma No tissue studied—probable hypernephroma	1 1 2
40–49	7	20.0	Hypernephroma No tissue studied—probable hypernephroma Metastasis—involving kidney secondarily	5 1 1
50–59	7	20.0	Hypernephroma Transitional cell carcinoma of renal pelvis Squamous cell carcinoma of renal pelvis	4 1 2
60–69	5	14.3	Sarcoma undifferentiated Hypernephroma No tissue studied—probable hypernephroma	1 2 2
70–79	5	14.3	Papillary carcinoma of renal pelvis Benign adenoma of renal cortex Hypernephroma No tissue studied—probable hypernephroma	1 1 1 2
80–89	1	2.9	No tissue studied—probable hypernephroma	1

was a woman 65 years old with a staghorn calculus on the left and a tumor in the lower pole of the right kidney The staghorn calculus was removed to salvage the kidney The tumor of the other kidney was treated with high voltage roentgen therapy The patient lived five months and died from metastasis The other patient was a 46-year old man (Fig 7) The calculi were removed from his left kidney, and the tumor on the right was treated with high voltage roentgen therapy After three years he is well and healthy and subsequent pyelograms (Fig 8) have shown complete disappearance of the neoplasm It has not recurred after three years

Four patients (Table 5) received both preoperative and postoperative roentgen therapy Two of these had hypernephromas, and both are now dead Two had Wilms tumors, and only 1 is living (Fig 9) He is healthy nine years after the nephrectomy The number of patients treated by preoperative high voltage roentgen therapy in this series is too small to draw conclusions, but the value of preoperative roentgen therapy for an operable tumor is

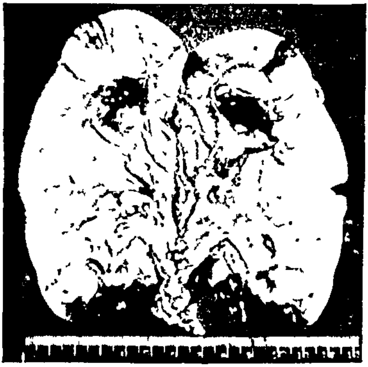

Fig 3 —Same case as Figure 2 The removed kidney showing the pelvic neoplasm

TABLE 3.—*Relation of Symptoms to Type of Tumor*

Symptoms	Diagnosis Made by Tissue Study from Surgical or Autopsy Specimens																		Diagnosis made by pyelograms, no tissues studied			Totals	
	Hyper-nephroma			Wilms tumor			Intrapelvic tumor			Sarcoma			Benign tumor			Metastatic tumor							
	No. of cases	% of 35 cases	% of 13 cases	No. of cases	% of 35 cases	% of 5 cases	No. of cases	% of 35 cases	% of 5 cases	No. of cases	% of 35 cases	% of 2 cases	No. of cases	% of 35 cases	% of 1 case	No. of cases	% of 35 cases	% of 1 case	No. of cases	% of 35 cases	% of 8 cases	No. of cases	% of 35 cases
No. of cases of each type	13	37.1*		5	14.3		5	14.3		2	5.7		1	2.9		1	2.9		8	22.9		35	
Gross hematuria	10		76.9**	2		40	3		60	0		0	0		0	0		0	7		87.5	22	62.9
Pain in side	8		61.5	3		60	5		100	2		100	1		100	1		100	6		75.0	26	74.3
Mass in side	5		38.5	4		80	0		0	2		100	0		0	0		0	2		25.0	13	37.1
Nausea	0		0	2		40	2		40	1		50	0		0	1		100	2***		25.0	8	22.9
Weakness. . .	4		30.8	2		40	3		60	1		50	0		0	1		100	4		50.0	15	42.9
Loss of weight	3		23.1	2		40	3		60	1		50	0		0	1		100	3		37.5	13	37.1

*The 8 tumors diagnosed only by pyelography were probably hypernephromas, and if added to the 13 diagnosed by tissue study would raise the number of hypernephromas to 21 cases, or 60.0% of the total number studied.

**If the 7 cases presenting gross hematuria from the group of 8 tumors diagnosed by pyelography only (and probably hypernephroma) are added to the 10 cases with gross hematuria from the group of proven hypernephromas; then the total number of cases of hypernephroma with gross hematuria is 17 or 81.0% of the total group studied.

***Associated with stones in other kidney.

questionable. Harvey and Norman,[1] in a study of 54 cases, advocated preoperative roentgen therapy in all cases. They reported 42 per cent of five-year survivals in cases in which preoperative roentgen therapy was employed. They did not report the survival rate for cases in which only postoperative roentgen therapy was used. Deming[5] reported a study of 82 cases in 1946 and rang a pessimistic note about the problem in general. He cited Ladd of Boston as having given up the use of preoperative high voltage roentgen therapy. The obvious value of preoperative roentgen therapy is to reduce the size of a large neoplasm and so to facilitate its removal; but if an anterior transabdominal approach is used there is no need to reduce the size of a tumor preoperatively. The time lost while the patient receives roentgen therapy prior to nephrectomy is probably prejudicial to his being cured.

Nephrectomy was performed in 24 of our 35 cases. In 8, operation was not performed. In 2 cases renal biopsies, but not nephrectomies, had been performed elsewhere. One patient with a metastatic carcinoma (from the lung) was not operated upon, but tissue for study was obtained at autopsy. We used a transabdominal approach in 7 cases and a flank in-

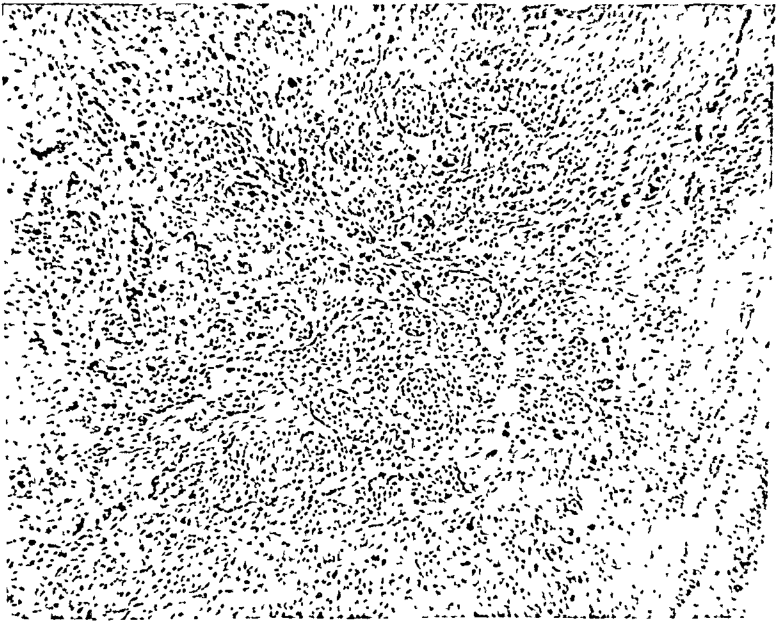

Fig 4—Microphotograph in same case, showing the malignant tumor

TABLE 4—*Relationship of the Three Major Symptoms to Survival*

Symptom	Total no of cases with symptom	% of 35 cases	No of patients now dead	% of patients with the symptom now dead	Comment
Gross hematuria	22	62.9	8	(% of 19) 42.1	1 case of operative death, 2 cases not followed, 3 cases not included in the 42.1%
Pain in side	26	74.3	11	(% of 22) 50.0	2 cases of operative death, 2 cases not followed these 4 cases not included in the 50.0%
Mass in side noticeable to patient or parent	13	37.1	7	(% of 11) 63.6	2 cases not followed and not included in the 63.6%

Seventeen or 53.1% of the 32 patients whose course has been followed are now living and have been observed for an average period of 19.5 months The shortest period is 2 months and the longest is 9 years

Fifteen or 46.9% of the 32 patients whose course has been followed are now dead The average survival after discovery of the tumor was 6.5 months. The longest survival period was 14 months.

Three patients have not been followed

TABLE 5.—*Roentgen Therapy*

Type of Neoplasm	Cases in Series of 35		Preop. & Postop. Roentgen Therapy, including 1 not having nephrectomy, but biopsy taken								Postop. Roentgen Therapy only								No Roentgen Therapy							
	No.	% (35)	Cases	%	Livg	%	Dead	%	Not Fol	%	Cases	%	Livg	%	Dead	%	Not Fol	%	Cases	%	Livg	%	Dead	%	Not Fol	%
Hypernephroma	13	37.1	2	15.4 (13)	0	0 (2)	2	100	0	0 (2)	8	61.5 (13)	7*	88.5 (8)	0	0 (8)	1	12.5 (8)	3	23.1 (13)	1	33.3 (3)	1**	33.3 (3)	1	33.3 (3)
Squamous cell carcinoma of right pelvis	3	8.6	0								2	66.6 (3)	0	0%	2	100 (2)	0	0	1	33.3 (3)	1***	100	0	0	0	0
Transitional cell carcinoma of right pelvis	1	2.9	0								0								1	100 (1)	0	0	1****	100 (1)	0	0
Papillary carcinoma of right pelvis .	1	2.9	0								1	100 (1)	1†	100 (1)	0	0	0	0	0							
Wilms tumor	5	14.3	2	40 (5)	1††	50 (2)	1	50 (2)	0	0	3	60 (5)	1¶	33.3 (3)	2	66.6 (3)	0	0	0							
Sarcoma	2	5.7	0								2	100 (2)	1′ (2)	50	1″ (2)	50	0	0	0							
Metastatic renal neoplasm	1‴	2.9	1	100 (1)	0	0 (1)	1	100 (1)	0	0	0								0							
Benign neoplasm	1	2.9	0								0								1	100 (1)	1	100 (1)	0	0	0	0
No tissue diagnosis; probably Hypernephroma	8⁗	22.9	5	62.5 (8)	2	40 (5)	2	40 (5)	1	20 (5)									3	37.5 (8)	1	33.3 (3)	2	66.6 (3)	0	0 (3)
Totals . ..	35		10	28.6 (35)	3	30 (10)	6	60 (10)	1	10 (10)	16	45.7 (35)	10	62.5 (16)	5	31 (16)	1	6.2 (16)	9	25.2 (35)	4	45 (9)	4	45 (9)	1	11.1 (9)

NOTE: Percentages based on their respective groups. Figures shown thus ( ) are totals from which percentages are calculated.

*Average postoperative age is 14.3 months and all are healthy

**Surgical death.

***Patient in poor condition five months after operation, has extensive metastasis.

****Died two days postoperatively. Had extensive metastasis at time of operation.

†Is healthy after one year

††Is healthy after nine years

¶Is healthy after two years. Chest metastasis appeared and disappeared after roentgen therapy.

′Is healthy after eight months. He had a perineal liposarcoma.

″Died seven months after operation

‴Had primary bronchiogenic carcinoma.

⁗Operation was not done

cision in 17. Of the 7 nephrectomies performed by the transabdominal route, approach through a pararectus incision was used in 2. In 1 patient with a large sarcoma of the right kidney (Fig 10) it was necessary to convert the incision into a T in order to obtain sufficient exposure. In 5 cases the incision was subcostal, parallel to and just below the costal margin on the side of the tumor. Usually the *incision extended from the xiphoid process to* a point near the tip of the twelfth rib. This incision can be extended as far laterally as may be necessary to gain adequate exposure. By using this approach the surgeon can isolate and ligate the renal pedicle before the neoplasm is molested. The operating time is reduced, and the position of the patient on the operating table is better for both patient and anesthetist.

Sixteen (45.7 per cent) of our patients received an adequate course of high voltage roentgen therapy after nephrectomy but not *before, of these, 10 are living 5 are dead and* 1 has not been followed. Eight of these had hypernephromas and 7 of this group are living after an average of fourteen and three tenths months after nephrectomy. One has not been followed. Two patients with squamous cell carcinoma of the renal pelvis treated by high voltage roentgen therapy failed to survive one year. A third patient with squamous cell carcinoma of the renal pelvis was not given high voltage roentgen therapy and is living (though in a critical condition because of metastasis) five months after the operation. The 1 patient with papillary carcinoma of the renal pelvis is now living and healthy one year after a nephroureterectomy. Three patients with Wilms tumor were given postoperative roentgen therapy. Two are dead, 1 is living after two years. In the survivor of this group metastases to the chest occurred shortly after the nephrectomy but they disappeared shortly after roentgen therapy was given and have not recurred. In spite of this favorable result from the roentgen therapy, the prognosis in this case is very poor. The only conclusion any one can draw from this series of 3 Wilms tumors or any of the reported series of Wilms tumors is that it is a highly fatal disease regardless of the therapeutic program followed.

Fig 5.—Photograph of unsectioned left kidney in a 46 year old colored man with a hypernephroma of the upper pole.

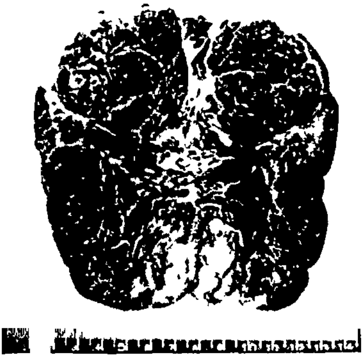

Fig 6.—Same as Figure 5. The kidney after longitudinal sectioning, showing the hypernephroma in the upper pole.

The 2 cases of sarcoma are recent. In 1 of them the patient had a very large undifferentiated, highly malignant tumor and died seven months after nephrectomy. The other had a liposarcoma of the perirenal tissues with invasion of the kidney. He was a 24 year old

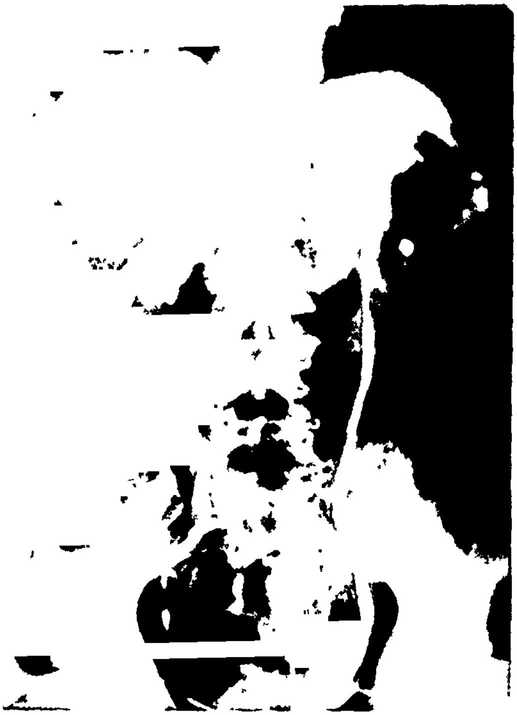

Fig. 7.—Pretreatment retrograde pyelogram of a 46-year-old man with multiple calculi in an incompletely rotated left kidney and a tumor in the right kidney.

Mexican who presented an unusual clinical picture. He had been in excellent health until he was suddenly seized with a severe pain in the left upper quadrant of the abdomen. He was admitted as an emergency patient with an acute abdominal condition. A large, very tender mass could be palpated in the left upper quadrant. Excretory urograms failed to visualize on the left but were normal on the right. A left retrograde pyelogram revealed a tumor of the lower pole of the left kidney (Fig. 11). Because of the severe pain, left nephrectomy was performed as an emergency procedure. A left subcostal incision was used, and the approach was transperitoneal. The removed kidney (Fig. 12) revealed a large perineal liposarcoma with invasion of the lower pole of the kidney and extensive hemorrhage into the substance of the neoplasm, which accounted for the severity of the symptoms. The patient is now healthy after eight months. Roentgen therapy was given after the operation.

Table 6 shows the survival rate after operation or initial examination. Most of the patients have not been observed long enough to determine whether they are cured or not, but the best results seem to have been reached in cases of hypernephroma treated by nephrectomy and postoperative roentgen therapy. The survival rate—17 of 32 patients followed—will probably drop much lower before the end of the fifth postoperative year. The patient with Wilms tumor living after nine years represents one of those fortunate results seldom observed and difficult to explain. The 2 patients with hypernephroma treated by nephrectomy as well as preoperative and postoperative roentgen therapy failed to survive, which raises a doubt as to the wisdom of delaying operation long enough to give a preoperative course of high voltage roentgen therapy. Figure 13 is a photograph showing the gross changes in the kidney in 1 of these cases. Notice the areas of hemorrhage in the tumor. Microscopically this tumor revealed a great deal of fibrosis and some necrosis. These changes are usually interpreted as showing a favorable response to irradiation, and they are usually associated with some degree of regression in

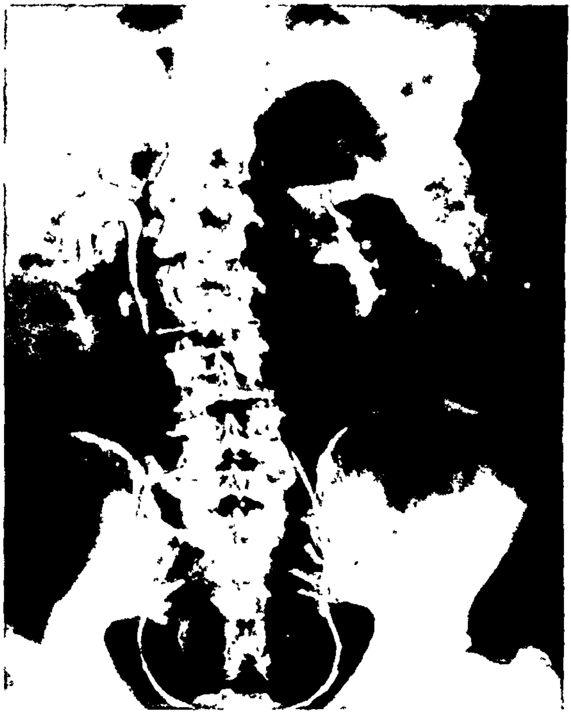

Fig. 8.—Same as Figure 7, two years after high voltage roentgen therapy. Notice that there is no further evidence of a neoplasm of the kidney.

TABLE 6.—*Survival After Operation or Initial Examination*

Type of neoplasm	Cases	Roentgen therapy	Cases w/o *fol-up* study	Survival period											Totals				Totals for Each type
				To 1 yr		To 2 yrs.		To 3 yrs.		To 4 yrs.		(1)	9-10 yrs.						
				Lvg	Dead	Lvg	Dead	Lvg	Dead	Lvg	Dead		Lvg	Dead	Lvg	Dead	Not Fol		
Hypernephroma	13	Preop & Postop					2									2		2)	13
		Postop only	1	5*		1				1					7		1	8)	
		None	1		1**	1									1	1	1	3)	
Squamous cell carcinoma of renal pelvis	3	Postop only			2											2		2)	3
		None		1***											1			1)	
Transitional cell carcinoma of renal pelvis	1	None			1****											1			1
Papillary carcinoma of renal palvis	1	Postop. only				1									1				1
Wilm's tumor	5	Preop & Postop			1								1		1	1		2)	5
		Postop only			2	1									1	2		3)	
Sarcoma	2	Postop		1	1										1	1			2
Metastatic carcinoma of the kidney	1	No op, roentgen therapy			1											1			1
Benign neoplasm	1	None		1											1				1
Diagnosed by pyelography; probably Hypernephroma	8	No op; roentgen therapy given	1		2	2									2	2	1	5)	8
		No op, no roentgen therapy		1	2										1	2		3)	
Totals	35		3	9	13	6	2			1			1		17	15	3		35

(1) Between five and nine years there are no cases to report
* [illegible] fter roentgen therapy Patient is healthy [illegible] months after operation
** [illegible]
*** [illegible]
**** [illegible] sive metastasis

the size of the tumor; but cellular activity is not completely arrested, and the patient is not benefited by prolonged exposure to the malignant disease.

SUMMARY AND CONCLUSIONS

In a clinical study of 35 cases of renal neoplasm followed for a relatively short period and compared with other studies reported in the literature, we have tried to reemphasize some of the cardinal features of the disease In most cases the patient seeks medical advice because of blood in his urine or because of a pain or a palpable mass in his side These three symptoms do not occur as a rule until late in the disease; therefore, in many cases, the patient is not warned of his danger until the malignant growth has advanced beyond the status of a local process. At present there is no method by which one can discover an early

Fig. 9—Photograph of a Wilms tumor in a kidney removed from a 7-year-old boy. He is now living and well after nine years.

Fig. 10.—Photograph of a large sarcoma of the right kidney in a 62 year-old man.

malignant tumor of the kidney prior to the onset of symptoms unless one resorts to routine pyelographic study; and it would be impractical to attempt this for early diagnosis of a disease occurring as infrequently as does malignant disease of the kidney. In most instances gross hematuria is the earliest symptom; pain usually occurs a little later in the course, and the presence of a mass in the side is evidence of an advanced process. As one would expect, patients with renal tumors who present themselves for treatment because they have felt a mass in the side are offered the poorest prognosis.

The value of preoperative roentgen therapy is probably more than offset by the time lost in delaying surgical removal of the primary growth. However, this is a debatable issue about which one should maintain an open mind until larger series of cases followed over a much longer period have been studied.

The surgical approach for nephrectomy is not one of the important points in the management of these cases, but we prefer a transabdominal approach through a subcostal incision. It gives easier access to the kidney, especially if the tumor is very large. An additional factor is that the position of the patient is less strained than if he were in lateral flexion, as is usually the case when the flank incision is used.

RÉSUMÉ

Dans une étude clinique de 35 cas de néoplasme du rein suivie pendant quelques temps, et comparés avec d'autres rapports de la litt-

Fig. 11.—Left retrograde pyelogram of a 24-year-old Mexican man with a large perineal liposarcoma.

érature, l'auteur note avec emphase les principaux signes de cette maladie. Dans la plupart des cas, le malade consulte le médecin parce qu'il a vu du sang dans ses urines ou qu'il a une douleur ou une grosseur palpable dans le côté. Ces trois symptômes ne surviennent dans la plupart des cas, que tard dans la maladie. Ainsi, dans beaucoup de cas, le malade n'a pas envisagé le danger qui le menaçait et la grosseur maligne a avancé au-delà de l'état local. Actuellement, nous n'avons aucune méthode par laquelle on peut faire un diagnostic de tumeur du rein, avant la survenance des symptômes, excepté que si on fait une pyelographie et celà n'est pas praticable Dans la plupart des cas, une hématurie marquée est le premier symptôme, la douleur survient après durant le cours de la maladie et la présence d'une grosseur dans le côté est évidence que l'état est avancé Le malade ne pense pas au traitement avant que cette masse soit située dans le côté et le pronostic est souvent très grave. La valeur à l'aide des rayons "X" est discutable et souvent retarde l'enlèvement chirurgical de la tumeur. Pour les mêmes raisons, il est mieux de ne pas se fier sur la valeur des rayons "X" Pour la néphrectomie, on peut employer la voie transabdominalle avec l'incision sous-costate La voie transabdominalle donne un meilleur approche au rein, surtout si la tumeur est à gauche On peut employer les rayons "X" dans tous les cas excepté ceux du carcinome. Pour cette dernière condition nous n'avons aucun traitement; l'opération offre peu de résultats encourageants. La tumeur hypernephroide traitée par la néphrectomie et la thérapie aux rayons "X" postoopératoire offre le pronostic le plus favorable.

Des statistiques sur la survivance après 5 ans varient beaucoup de 10% (Graham 6) à 19,5% (Deming 5) à 42% (Harvey)

Le traitement postopératoire sera commencé aussitôt que possible. Généralement le jour suivant. L'enthousiasme de certains roentgénologistes a produit des réactions cutanées très sévères et très douloureuses, telles que le malade était incapacité La thérapie de roentgen ne doit pas être portée aussi loin

RESUMEN Y CONCLUSIONES

En un estudio clínico de 35 casos de neoplasia renal observados durante un período de tiempo relativamente corto, y comparados con otros estudios comunicados en la literatura, los autores han tratado de destacar algunos de los rasgos principales de esta enfermedad En la mayoría de los casos, el paciente solicita consejo médico por tener sangre en la orina o por existir un dolor o tener una tumoración palpable en un costado Estos tres síntomas no se presentan en la mayoría de los casos hasta que la enfermedad está bien avanzada, por lo tanto, en muchos casos el paciente no tiene ninguna señal de peligro hasta que el proceso maligno ha avanzado más allá de la fase de un proceso local. En el presente no hay ningún método por el que se pueda descubrir un proceso maligno del riñón en su fase precoz y antes del comienzo de los síntomas, a menos que se recurra a la pielografía sistemática, resultando poco práctico intentar practicarla para el diagnóstico precoz de una enfermedad que se presenta tan raramente como los procesos malignos del riñón En la mayoría de los casos, el síntoma precoz es una hematuria visible presentándose el dolor generalmente poco después, en el curso de la afección, y siendo la presencia de una tumoración en el costado un signo de un proceso adelantado.

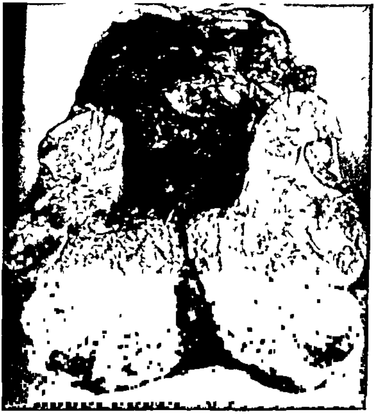

Fig 12 —Photograph of the left kidney and tumor removed from the patient whose pyelogram is shown in Figure 11

Como podría esperarse, los pacientes de tumoración renal que se presentan espontáneamente para ser tratados porque tienen una tumoración en el costado son los que presentan peor pronóstico. El valor de la roentgenografía preoperatoria probablemente resulta más que contrarrestada por el retraso que representa el postponer la extirpación quirúrgica de la neoformación primaria. Sin embargo, este es un asunto discutible, sobre el cual no puede formarse un juicio definitivo hasta que se hayan estudiado un mayor número de casos y durante un período de tiempo más largo.

Aunque la vía quirúrgica que se adopta para la nefrectomía es uno de los puntos importantes en el tratamiento de estos casos, el autor prefiere la vía transabdominal a través de una incisión subcostal, que proporciona un absceso más fácil al riñón, especialmente si el tumor es muy grande. Un factor adicional es que la posición del paciente resulta menos forzada que si se hallara en flexión lateral, como sucede generalmente cuando se emplea la incisión a través del costado.

La roentgenoterapia postoperatoria tiene valor en todos los casos, excepto en aquellos de carcinoma de células escamosas. Por la naturaleza extremadamente maligna de esta neoplasia, así como por su tendencia a la metástasis muy precoz, no existe tratamiento para la misma. La roentgenoterapia as ineficaz y la operación no sirve para nada, mas que para obtener tejidos para su estudio. Los tumores hipernefroides tratados por la nefrectomía y la roentgenoterapia postoperatoria son los que ofrecen un pronóstico más favorable.

Las estadísticas de la supervivencia a los 5 años varían considerablemente, desde el 10% (Graham 6), y 19.5% (Deming %), al 42% (Harvey 4).

La terapia postoperatoria debe comenzarse

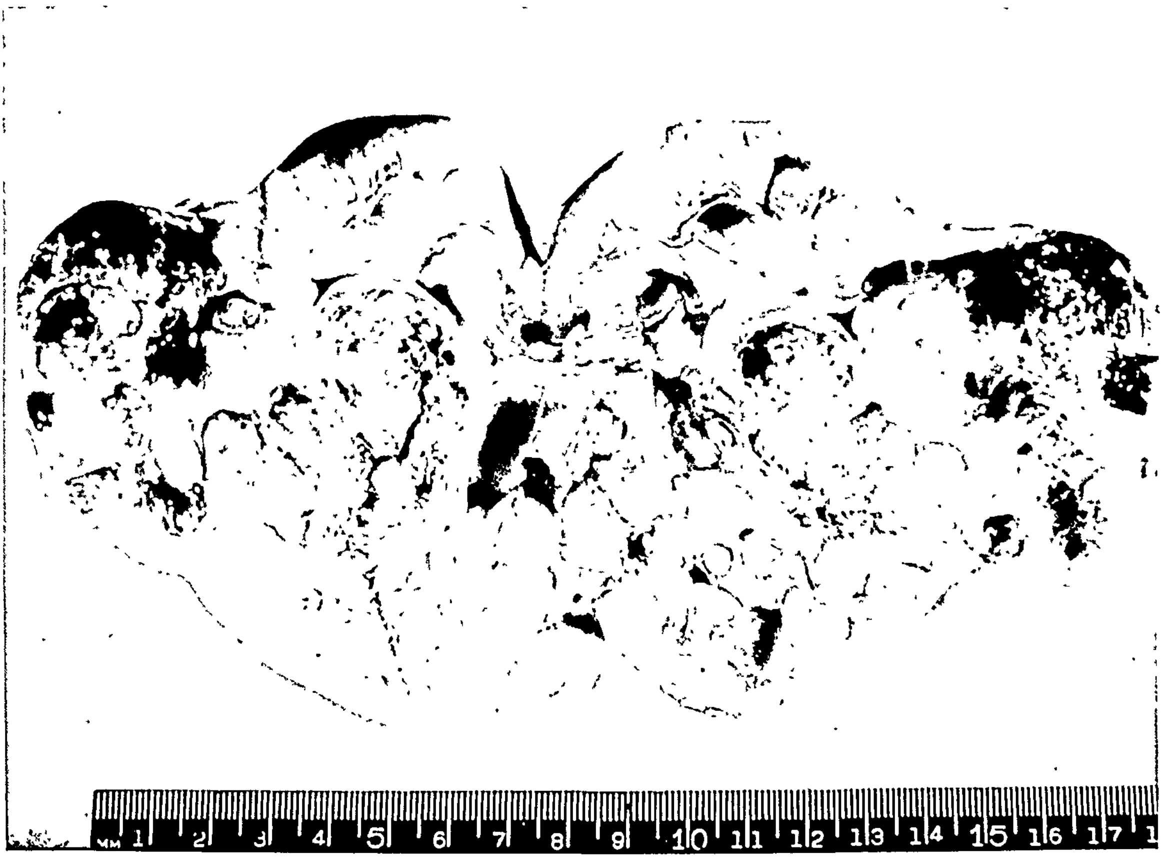

Fig. 13.—Photograph of a kidney and hypernephroma in the case of a woman who received preoperative roentgen therapy. Notice the degenerative changes in the tumor.

tan pronto como sea posible después de la nefrectomía, generalmente al día siguiente. El entusiasmo de algunos radiólogos ha resultado en graves reacciones cutaneas, determinantes de tanto dolor que han invalidado al paciente. La roentgenoterapia no debe llevarse tan lejos que pueda causar estos resultados.

RIASSUNTO

Inquadra 35 tumori renali occorsi alla sua osservazione nella letteratura sull'argomento, per ricordare i sintomi fondamentali. Nella maggioranza dei casi, i pazienti ricorrono al medico o per la comparsa di sangue nell'urina, o per dolori, o per la comparsa di masse palpabili nei fianchi. Questi sintomi non insorgono pero'—nella maggioranza dei casi—che in una fase inoltrata della malattia: ecco perche' il paziente non e' reso edotto del pericolo se non allorquando il tumore maligno ha superato la fase di una malattia locale.

Attualmente non disponiamo di un metodo capace di rivelare un tumore maligno dei reni prima della comparsa di sintomi clinici. L'unico metodo sarebbe la pielografia eseguita sistematicamente in tutti i casi, ma cio' non sarebbe un espediente pratico di fronte alla rarita' dei tumori renali. Nella maggioranza dei casi l'ematuria rappresenta il sintomo iniziale; i dolori insorgono un po' dopo; la presenza di masse palpabili riesce evidente solo nelle fasi avanzate. Ecco perche' i pazienti che ricorrono al medico solo allorquando hanno avvertito qualche massa palpabile offrono la prognosi peggiore.

L'utilita' della radioterapia preoperativa e' probabilmente annullata dall'intervallo di tempo sprecato nell' asportazione del tumore. Si tratta, ad ogni modo, di unargomento non ancora definito in un senso o nell'altro: solo una piu' larga esperienza potra' decidere in merito.

L'A. preferisce eseguire la nefrectomia per via addominale, con un'incisione subcostale, perche' offre una migliore via di accesso al rene, specialmente quando si tratti di tumori molto voluminosi. Un altro vantaggio consisterebbe nel fatto che i pazienti non debbono essere posti in una posizione cosi disagevole come nella flessione laterale.

La radioterapia postoperatoria e' utile in tutti i casi, meno che nei cancri a cellule spinose. Data l'estrema malignita' di questi tumori e la rapida tendenza a metastasi, non disponiamo ancora di alcuna cura per questi. L'operazione non offre nulla, se non del materiale per l'esame microscopico, mentre la radioterapia e' inefficace. Gli ipernefromi curati con la nefrectomia e l'irradiazione postoperatoria offrono la prognosi migliore.

La percentuale di sopravvivenza dopo 5 anni varia da 10% (Graham) a 19,5% (Deming) a 42% (Harvey).

Le cure postoperative dovrebbero essere iniziate subito possibilmente il giorno dopo l'operazione. Un'avvertenza viene infine data ai radiologi. Nell'entusiasmo per i raggi X la dose viene spinta ad un punto tale, da determinare spesso intense reazioni cutanee. La radioterapia non dovrebbe mai essere spinta al massimo.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Wir haben versucht in einer klinischen Untersuchung von 35 Faellen von Nierengeschwuelsten, die wir fuer eine verhaeltnismaessig kurze Zeitspanne verfolgt und mit anderen Beobachtungen in der Literatur verglichen haben, einige der wesentlichen Charakterzuege der Erkrankung von Neuem zu betonen. In den meisten Faellen sucht der Kranke aerztlichen Rat wegen Harnblutung, wegen Schmerzen oder wegen einer tastbaren Geschwulst in der Seite. Diese drei Krankheitszeichen treten meist erst spaet im Laufe der Erkrankung auf, daher ist die boesartige Geschwulst in vielen Faellen bereits ueber den Zustand einer oertlichen Schaedigung hinaus vorgeschritten, bevor der Kranke sich der Gefahr bewusst wird. Zur Zeit gibt es kein Verfahren zur Entdeckung eines boesartigen Nierentumors vor dem Auftreten von Krankheitszeichen, es sei denn, dass man zur routinemaessigen Pyelographie greift, und der Versuch, diese Methode gewohnheitsmaessig einzufuehren, waere wohl nicht zweckmaessig bei einer Erkrankung, die so selten auftritt wie eine boesartige Nierengeschwulst. In den meisten Faellen ist eine schwere Harnblutung das frueheste Krankheitszeichen, Schmerzen treten im allgemeinen etwas spaeter im Verlaufe der Krankheit auf, und das Vorhandensein einer Schwellung in der Flanke ist das Zeichen eines vorgeschrittenen Prozesses. Wie

zu erwarten, stehen die Kranken, die sich zur Behandlung einfinden, weil sie eine Geschwulst in der Seite gefuehlt haben, der schlechtesten Prognose gegenueber.

Der Wert praeoperativer Roentgenbehandlung ist wahrscheinlich laengst zunichte geworden durch den Zeitverlust, der durch die Versaeumnis der chirurgischen Entfernung der Primaergeschwulst entstanden ist. Immerhin ist dies ein strittiges Problem, dem man unvoreingenommen gegenuebertreten sollte, solange nicht groessere Reihen von Kranken ueber eine erheblich laengere Zeitspanne verfolgt und beobachtet worden sind.

Der chirurgische Zugangsweg zur Nierenamputation ist zwar kein allzu bedeutender Punkt in der Behandlung dieser Faelle, aber wir geben doch dem transabdominalen Zugang durch einen subkostalen Einschnitt den Vorzug. Die Niere ist, besonders wenn die Geschwulst sehr gross ist, auf diesem Wege leichter erreichbar. Dazu kommt, dass die Lage des Kranken weniger angespannt ist als in seitlicher Beugung, die gewoehnlich beim Flankeneinschnitt zur Anwendung kommt.

Postoperative Roentgenbestrahlung ist in allen Faellen wertvoll bis auf diejenigen, wo es sich um Schuppenzellenkrebse handelt. Wegen der grossen Boesartigkeit dieser Geschwuelste und wegen ihrer Neigung zu sehr fruehzeitiger Metastasierung gibt es fuer sie keine Behandlung. Roentgenbestrahlungen sind unwirksam, und die Operation bringt nichts zutage ausser einem Praeparat fuer die histologische Untersuchung. Hypernephroide Geschwuelste, die mit Nierenamputation und Roentgennachbestrahlung behandelt werden, haben die guenstigste Prognose.

Die Statistiken ueber Kranke, die fuenf Jahre ueberlebten, zeigen erhebliche Abweichungen, naemlich von 10% (Graham 6) ueber 19.5% (Deming 5) bis zu 42% (Harvey 4). Postoperative Behandlungen sollten der Nierenamputation so schnell wie moeglich folgen, gewoehnlich schon am Tage nach dem chirurgischen Eingriff. Die Begeisterung einiger Roentgenologen hat zu schweren Hautreaktionen gefuehrt, die mit so starken Schmerzen einhergehen, dass der Kranke schwer behindert ist. In solchen Ausmassen sollte die Roentgenbehandlung nicht durchgefuehrt werden.

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Complications in the Urinary Tract Following Left Colonic Operations

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AT the outset I should like to present a brief summary of the overall picture of this difficult problem, after which I shall present information obtained from the literature and from personal clinical experience in an attempt to outline briefly the current concept of urologists as to the causes and management of vesical dysfunction following abdominoperineal rectosigmoidectomy.

Infection of the urinary tract and retention of urine are the most consistent and most troublesome complications of this operation.

In approximately 15 per cent of the cases, in the majority of which the patients are male, urologic investigation is required. Infection, overdistention of the bladder, trauma to the pelvic autonomic nerve plexuses supplying the bladder, paravesical edema and edema of the vesical wall incident to the operative trauma, and obstruction of the vesical neck are the most important contributing factors in urinary retention and vesical dysfunction.

The morbidity rate of infection of the urinary tract in these cases certainly has been reduced by use of the sulfonamide drugs and antibiotics.

Management of the patient should begin prior to the operation. Although the patient himself may be concerned chiefly with his bowel difficulty, the physician should consult with him to discover any symptoms that may be referable to the urinary tract. This is especially important in cases of obstruction or impending obstruction in which, owing to the severity of the intestinal symptoms, an already abnormally distended bladder may be overlooked.

In some instances cystoscopic examination may be necessary. In a few instances, when the history suggests and urologic examination demonstrates an obstruction of the vesical neck, relief of the obstruction by transurethral resection or prostatectomy should precede abdominoperineal resection.

I advise the use of a small self-retaining catheter (No 16 Foley), which should be inserted prior to the operation Frequently, because of unavoidable delay, prolongation of the operation, intravenous use of fluids and administration of sedatives and analgesics, the patient is unable to recognize the sensation of a full bladder postoperatively, and overdistention of the bladder may occur

If overdistention occurs in the presence of a minor degree of obstruction of the vesical neck for which the bladder has previously compensated, a breakdown of compensation occurs This may require prolonged drainage or removal of the obstruction

The duration of the period of catheter drainage is important Five to ten days is the average period Continuous drainage with a closed system has been found most satisfactory If after removal of the catheter there is difficulty or frequency of urination, with passage of small amounts of urine, the patient should be catheterized to remove the residual content

If 100 cc. or more of residual urine is present the catheter should be reinserted for a second period

It is advisable that the patient be given several trials with the catheter and treated with one of the parasympathetic stimulant drugs, such as mecholyl bromide During this time cystometric studies and cystoscopic examination should be done If the cystometrogram shows a definite type of curve, due to nerve injury or fixation of the vesical wall, and the vesical neck on cystoscopic examination reveals no obstruction of moment, catheter drainage should be continued In some cases this drainage may be required for many days Resection of the entire circumference of the vesical neck in this type of case is necessary at times.

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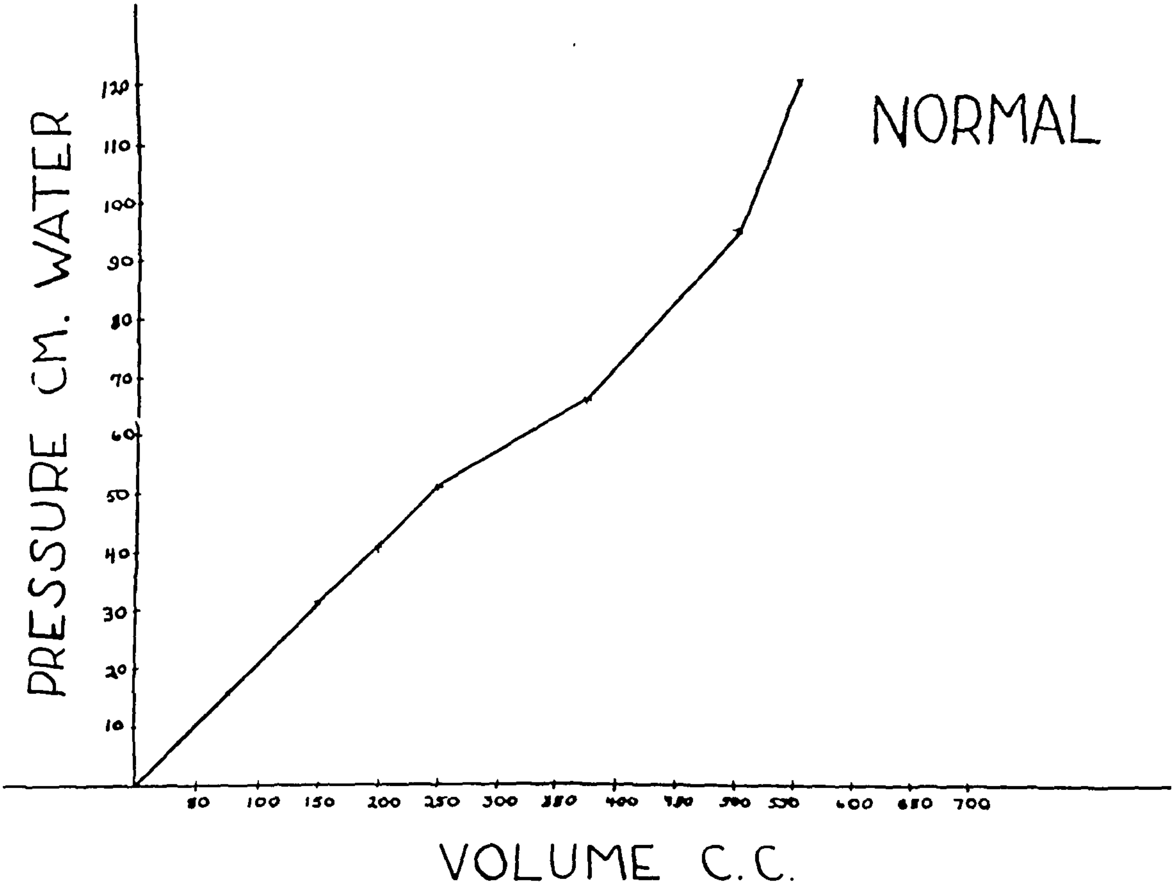

Fig. 1.—A composite of a group of normal adult cystometrograms.

During recent years many writers have noted a variation in the statistical incidence of complications in the urinary tract following abdominoperineal operation for carcinoma of the rectum. Some surgeons have noted that 100 per cent of their patients have such complications; others report a small incidence. The fact remains that infection of the urinary tract and retention of urine are the most consistent and most troublesome complications that occur.

Infection is undoubtedly the most common type of urinary complication, and it is probably infection to which some surgeons refer when they state that 100 per cent of their patients have complications referable to the urinary tract. The infection may manifest itself as mild or severe cystitis with retention and unilateral or bilateral pyelonephritis.

In an elderly patient, severe pyelonephritis may be a serious complication. Strict attention to the details of preoperative and postoperative management will reduce the severity of the infection and minimize the symptoms but will not prevent its occurrence.

In approximately 10 to 15 per cent of all patients who undergo an abdominoperineal operation, serious complications will develop in the urinary tract. These may occur early or late; they may respond readily to treatment or may cause prolonged disability, and major surgical procedures are required for their correction. Death may follow transurethral resection of the vesical neck or prostate for the relief of retention in a patient who has made an otherwise uneventful recovery from his abdominoperineal operation, as witness the following case:

F.W.H., a 78-year-old man, came to the clinic in April 1945 because of recurrent gastric symptoms

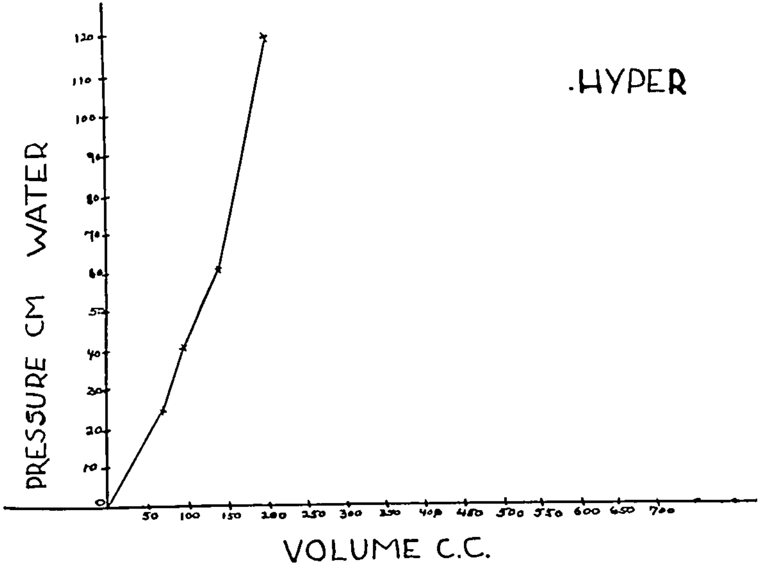

Fig. 2—A hypertonic type of cystometrogram seen in some types of disease of the spinal cord and in some cases of vesical disease.

and rectal bleeding. He had been treated in the clinic in 1941 and 1942 for a gastric ulcer. The last roentgen examination in 1942 revealed a healed gastric ulcer. Roentgen examination at the time of his last admission disclosed a carcinoma in the area of the old gastric ulcer. Rectal examination disclosed a mass of the cauliflower type on the posterior wall of the rectum, just above the sphincter. Biopsy specimens showed infiltrating papillary carcinoma.

The prostate was atrophic and fibrous There were no urinary symptoms. A subtotal gastrectomy and a gastrojejunostomy were done; recovery was uneventful. Approximately one month later a Lynch operation was done for the rectal carcinoma. Recovery was uneventful except for inability to void. Intermittent catheterization and Foley catheter drainage were employed. Approximately three weeks after the Lynch operation, cystoscopic study revealed a prostatic bar with contracture of the vesical neck. The bar and the circumference of the vesical neck were resected. After removal of the Foley catheter the patient was unable to void at times or voided large quantities of urine. Sizable quantities of residual urine remained.

At the time of his discharge from the hospital the patient was being catheterized twice daily. A few weeks later he had chills and fever and the physical signs of acute bilateral pyelonephritis. He was given sulfonamides and penicillin therapy Death occurred from urosepsis.

Before proceeding to a discussion of the causes and treatment of vesical dysfunction following abdominoperineal operations, it may be well to mention briefly the complications that occur as a result of surgical trauma to the urinary tract, such as ureteral and vesical injuries. Such damage usually presents individual problems and must be dealt with accordingly.

The surgeons who do this type of operation on the large bowel are to be congratulated on the low incidence of ureteral injuries. The surgeon in most instances is careful to identify the left ureter, but he should bear in mind that injury to the right ureter occurs in a fair number of cases. It is incumbent on him to identify both ureters

When ureteral injury is recognized at operation a repair of the hiatus should be made, or, if the ureter has been divided, reimplantation into the bladder or an end-to end anastomosis with a splinting catheter should be done. The method described by Curtis is excellent. It is imperative that urologic investigation be done to establish the site of injury to the urinary tract as soon as leakage of urine occurs from either the abdominal or (as is usually the case) the perineal wound.

Early recognition of these injuries and adequate care may prevent the morbidity associated with progressive hydronephrosis and pyelonephritis, obviating the need for nephrectomy.

Complications occurring as a result of invasion of the bladder by the growth may also be responsible for problems in diagnosis and subsequently for postoperative vesical complications.

I have observed a patient with these complications during the past two years.

D.B., a 63-year-old man, came to the clinic only because of frequency and terminal dysuria and hematuria of several months' duration. His history disclosed several attacks of pain in the left lower abdominal quadrant, the first attack having occurred thirty years before. The history of the attacks suggested an intestinal origin, probably diverticulitis. There was no history of the passage of blood from the rectum.

A cystogram revealed an extensive filling defect. Cystoscopic examination suggested a neoplasm of the vesical wall. The pathologic report of sections removed from several areas indicated chronic inflammatory tissue.

Roentgenographic examination of the gastrointestinal tract revealed a carcinoma of the sigmoid, and at operation an abscess was observed between the bowel and the urinary bladder at the point of attachment. A section removed from the vesical wall and from the peritoneal surface of the bowel revealed no evidence of neoplasm, and no neoplastic cells were observed in some small mesenteric nodes. An anterior resection was performed.

For a time after the operation the patient's vesical function was greatly improved. Frequency and terminal dysuria with hematuria then recurred. The cystoscope revealed an extensive neoplasm, which on section was of an intestinal type. Obviously neoplastic cells had invaded the vesical wall at the time of the original examination but were not detected in the sections removed.

This is the type of case in which ureteral transplantation and cystectomy may be done, with removal of the lower intestinal segment. Patients in whom retention of urine follows an abdominoperineal rectosigmoidectomy are to be accorded the greatest consideration in this discussion.

The cause or causes of urinary retention following abdominoperineal resection are not clearly understood. Certain etiologic factors must be kept in mind. Minor obstruction of the vesical neck may be exacerbated after the operation, or urethral obstruction due to urethral strictures and, as Ewert suggested, the resistance offered by the urethra itself may cause retention in the presence of dysfunction of the detrusor muscle

Retention of urine in the absence of demonstrable obstruction or minimal obstruction has not been adequately explained

The physiologic nature of normal micturition is an interesting study but will be discussed only briefly in this paper. The normal filling and adequate emptying of the bladder depends chiefly upon the proper function of the detrusor muscle and the associated relaxation of the autonomic internal and the voluntary external sphincter. For this normal process an adequate nerve supply, a tonic and freely movable bladder wall with adequate support and the absence of abnormal obstruction at the vesical neck are necessary.

McCrea has been one of the chief proponents of the neurogenic theory of vesical dysfunction. As a result of trauma to or removal of the inferior, hypogastric or pelvic nerve plexuses, an atonic bladder develops. The cystometrogram in such cases shows a flattened curve of intravesical pressure, and the patient has a desire to void after the bladder is filled with a large quantity of fluid (see illustrations).

Whether the surgeon can minimize nerve trauma by keeping the dissection close to the rectal wall is debatable. Bacon reported a low

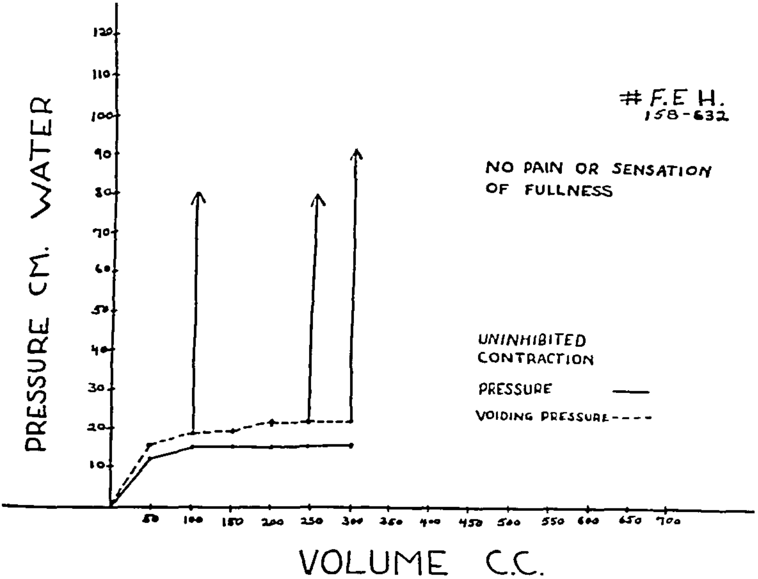

Fig. 3.—A hypotonic type of cystometrogram, in this instance due to injury of the spinal cord

incidence of vesical dysfunction following his proctosigmoidectomy, a "pull-through type of operation" with preservation of the anal sphincter, as compared to the Miles operation with extensive perineal dissection.

There are many students of this subject who do not agree with this neurogenic concept. Several investigators have failed to confirm the cystometric evidence of loss of nerve function in these cases. The nerve injury which occurs is not extensive enough to cause complete denervation of the bladder.

In some cases, after a transurethral resection, the patient voids normally and there is no demonstrable evidence of residual neurogenic vesical symptoms. If one were to assume that nerve injury is the chief cause, the incidence of retention should be the same in the two sexes.

Several writers believe that the chief contributing factors are the changes, chiefly mechanical, that occur in the bladder and the vesical neck as the result of the loss of its perineal supports. They differ, however, in their conception of the manner in which the anatomy of the bladder is altered. These mechanical theories may help to explain why vesical dysfunction with retention is less frequent in the female than in the male, since the bladder may receive support from the broad ligaments, the uterus and the tubes.

Patients with rather large prostates in whom retention of urine follows an abdominoperineal operation will usually regain good vesical function after its removal by prostatectomy or transurethral resection; this suggests that the presence of a definitely hypertrophied prostate prevents some angulation and fixation of the vesical neck and the prostatic portion of the urethra.

The presence of distortion, angulation and fixation of the urethra does not necessarily produce urinary obstruction, as is shown by the following case:

> C.R., an 81-year-old man recently observed, in whose case a diagnosis of carcinoma of the prostate in addition to carcinoma of the upper part of the rectum was made; showed symptoms of obstruction of the vesical neck. A biopsy of the prostate at the time of the abdominoperineal operation revealed a carcinoma primary in the prostate.
>
> Postoperatively the patient was given stilbestrol and prolonged urethral catheter drainage was employed, after which he still was unable to void. A cystotomy was done, and subsequently a transurethral resection. The urethra was markedly distorted and angulated, making the passage of the resectoscope difficult. A large amount of prostatic tissue was removed. The suprapubic sinus promptly closed, and the patient recovered good vesical function.

Campbell and Gislason recently discussed the subject and stated that, on the basis of cystoscopic examinations, they concluded that the most common observation was fixation of the vesical wall manifested by lack of mobility as the bladder was passively emptied. They expressed the opinion that this is due to pericystitis, traumatic in origin, which prevents the detrusor from functioning normally.

These observations in the single case in which they did a suprapubic cystotomy are most interesting and, in my opinion, add another factor that must be considered in the postoperative management of these cases. Undoubtedly, this type of pericystitis occurs more often than one might suppose, and is overlooked because cystotomies as a rule are probably not done early enough for observation of these changes.

The pathologic picture described by these observers could produce the "dome-shaped" bladders seen on cystograms reported by Hill, Barnes and Courville. These deformities were

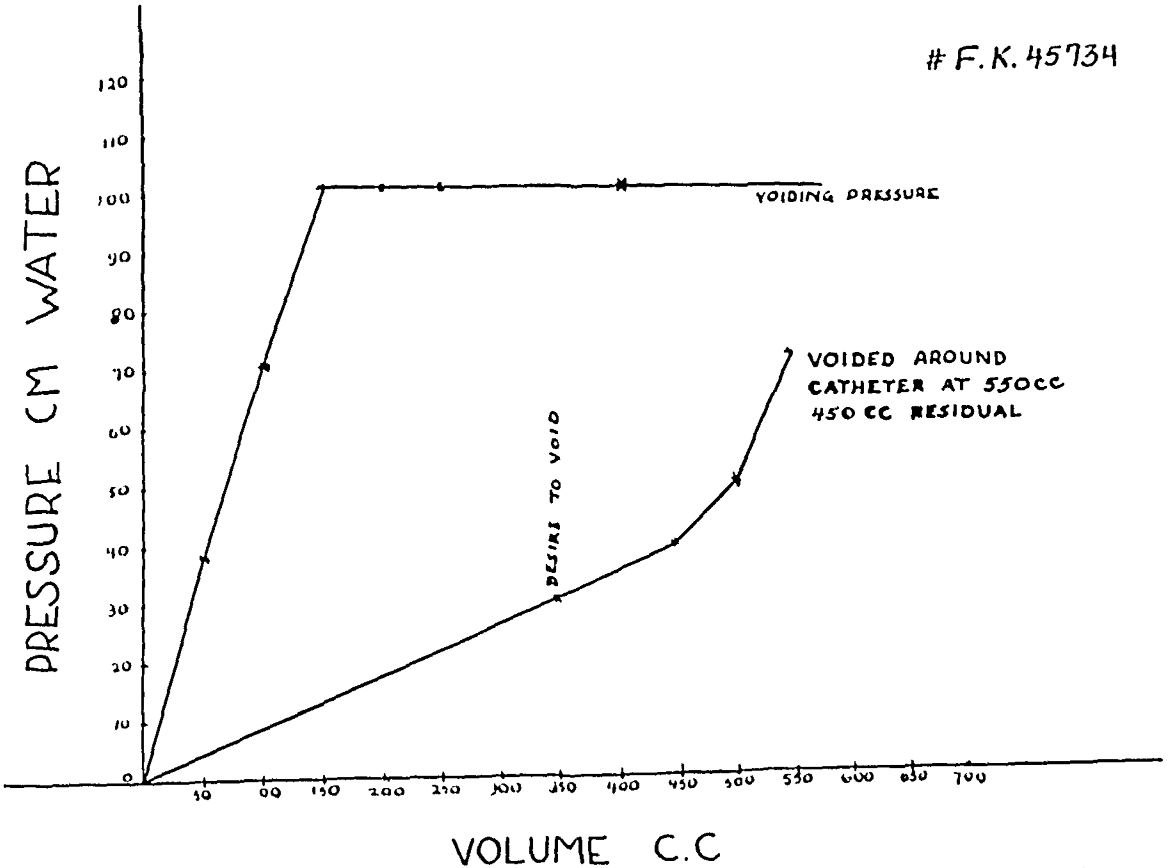

Fig. 1.—Type of cystometrogram usually observed in the cases under discussion. Note the atypical curve.

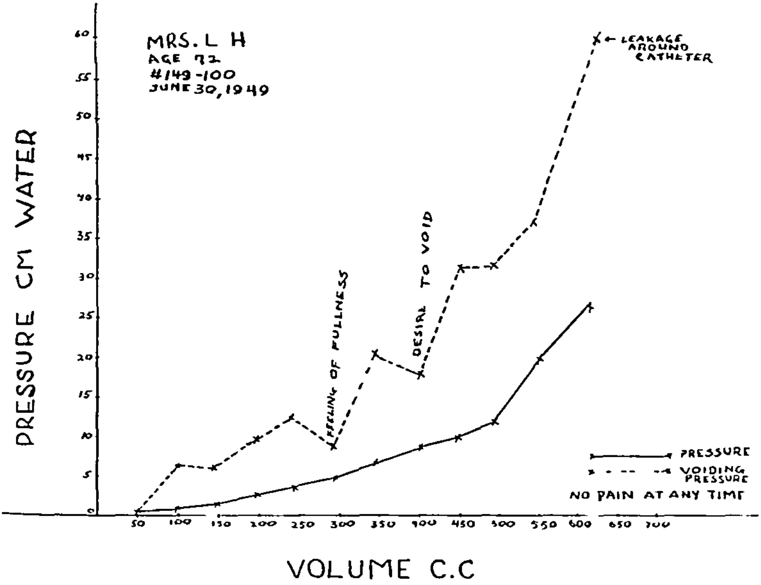

Fig 5—An atypical curve, yet definitely hypotonic

observed to disappear gradually beginning about the twelfth postoperative day This inflammatory paralysis or fixation of the wall of the bladder could simulate a neurogenic picture and probably produce a neurogenic type of cystometric curve

F C K, a man aged 66 underwent an abdominoperineal proctosigmoidectomy in February 1949 Pathologic examination of the specimen showed metastases to regional lymph nodes On the ninth postoperative day a small bowel obstruction necessitated reopening the abdomen A Foley catheter was left indwelling after the original operation, with intermittent drainage for twelve days. After its removal there was dribbling and voidings of 3 or 4 ounces, with a residual content up to 500 cc at times. A cystometrogram (Fig 4) showed a mixed type of curve Infection of the pelvic space, with drainage, persisted for some time.

Approximately five weeks after the proctosigmoidectomy a cystoscopic examination revealed intraurethral lateral lobe hypertrophy At the time of the original examination the prostate was described as normal to enlarged Grade 1, of a fibrous type with minimal vesical symptoms and only a few cubic centimeters of residual urine

The urethra was somewhat distorted Fifteen Gm of prostatic tissue was resected Postoperatively there developed epididymo-orchitis and a secondary hemorrhage There was urinary incontinence of the stress type, always with some 75 cc of residual urine Episodes of infection of the urinary tract occurred A second resection was done in an attempt to relieve the patient of his residual urine and stress incontinence, after which he was improved

Subsequently, roentgenograms of the pelvis revealed changes in the left ileum, probably due to metastases.

In this case the postoperative catheter drainage was apparently inadequate Probably the infection of the pelvic space produced paracystitis. No doubt there was some neurogenic disturbance secondary to paraneural metastases.

Campbell and Gislason observed that, owing to the interposition of the female generative organs, operative trauma to the bladder is somewhat minimized and pericystitis is therefore less apt to occur. They reported 2 cases of prolonged vesical dysfunction in 2 patients after proctosigmoidectomy, on both of whom total hysterectomies had been performed earlier.

Such an observation also suggests that postoperative urethral catheter drainage probably should be maintained for a longer period than is customary in order to permit complete bladder rest and restoration of normal detrusor mobility.

I recently observed a case of vesical dysfunction in a patient who had previously not undergone hysterectomy.

Mrs. L. H., a 72-year-old woman, had undergone an uncomplicated abdominoperineal resection for carcinoma in June 1949. An indwelling catheter was left in place and drained every four hours. The record shows that at times as much as 700 cc. of urine was obtained. The catheter was removed on the seventh postoperative day. The patient was unable to void and was catheterized every eight hours.

On the eleventh postoperative day a Foley catheter was inserted and continuous drainage instituted, and she received 200 mg. of mecholyl bromide three times a day. The catheter was removed at the end of one week. The patient voided variable quantities of urine. The amount of residual urine on three successive days was 500, 300 and 700 cc.

On the twenty-second postoperative day a cystometrogram was made (Fig. 5) and a Foley catheter again left in place for seven days. After its removal the patient voided adequate quantities of urine, at times as much as 500 cc. However, residual urine was present (less than 100 cc.) at the time of her discharge from the hospital.

I do not believe that complete rest can be obtained for the bladder by intermittent catheter drainage such as was employed postoperatively in this case. It should be noted that as much as 700 cc. of urine was obtained from the bladder at times.

One of my friends, also a surgeon, did an anterior resection, with general anesthesia, on a woman for carcinoma of the sigmoid. There were no difficulties incident to the operative procedure. Catheter drainage was employed for a period of days postoperatively, and after removal of the catheter the patient was unable to void. There appeared signs and symptoms of a pelvic abscess, which was drained through the vaginal vault.

Catheter drainage and intermittent catheterization were required for four weeks before spontaneous voiding occurred. Cystoscopic examination revealed no abnormalities of significance. In this instance the various contributing factors would be minimal, aside from the pericystitis incident to the operative trauma and secondary to the pelvic abscess.

It certainly would be logical to assume that edema and swelling of the vesical wall could produce fixation and at the same time interfere with the transmission of nerve stimuli.

It is my personal opinion that retention of urine is probably due to a combination of all the various factors suggested. There is no doubt that obstruction occurs as a result of neurogenic disturbances, but, I am inclined to believe that some form of obstruction also occurs in these cases which is not discernible or fails to be detected at cystourethroscopic examination because of the distortion and fixation of the urethra. Vesical function should be based on this type of reasoning.

SUMMARY

The author presents a study of complications referable to the urinary tract occurring after operations on the left side of the colon, with reports of several illustrative cases. He expresses the opinion that dysfunction of the bladder in every such instance requires individual study, since the dysfunction cannot safely be ascribed to any single cause.

RÉSUMÉ

L'auteur étudie les complications se rapportant auvoies urinaires et survenant après les opérations du côté gauche du côlon. L'étude est accompagnée de plusieurs cas illustrés. L'auteur exprime l'opinion que la dysfonction de la vessie urinaire accompagnant ces cas, exige une analyse individuelle, vu que cette dysfonction ne peut pas, avec sûreté, être attribuée a une cause unique.

RESUMEN

El autor presenta un estudio de las complicaciones localizadas en el tracto urinario y que se presentaron después de las operaciones en el lado izquierdo del colon, comunicando e ilustrando varios casos.

El autor opina que la disfunción de la vejiga en cada uno de dichos casos requiere un estudio individual, ya que la disfunción no puede, con seguridad, atribuirse a una sola causa.

RIASSUNTO

Esamina—in base a parecchi casi occorsi alla sua osservazione—le complicazioni che ricorrono nell'apparato urinario dopo operazioni sul lato sinistro del colon Ritiene che le disfunzioni vescicali postoperatorie non siano attribuibili ad una causa comune, ma a cause che variano da caso a caso. Da cio' la necessita' di un esame *individuale accurato, onde* stabilire l'etiologia ed effettuare la cura

ZUSAMMENFASSUNG

Der Verfasser berichtet ueber eine Untersuchung von Komplikationen seitens des Harnsystems, die nach Operationen an der linken Haelfte des Dickdarms vorkommen, und stellt einige erlaeuternde Faelle dar. Er gibt der Meinung Ausdruck, dass die Funktionsstoerung der Harnblase in jedem solcher Faelle ein individuelles Studium erfordert, da sie nicht mit Sicherheit auf eine einzelne Ursache zurueckgefuehrt werden kann

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Data on 22 Cases of Tenovaginitis of Radial Styloid

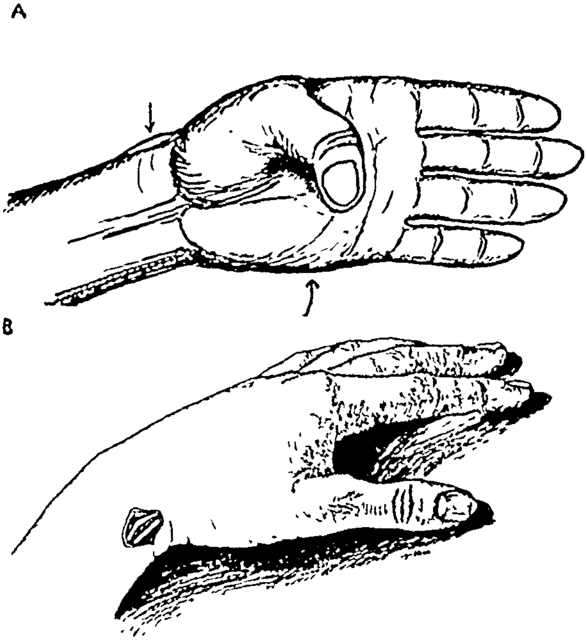
Patient	*Age*	*Sex*	*Wrist affected*	*Duration*	*Occupation*	*Date of operation*	*Result*
1	47	M	Left	5 mo	Mechanic	10/14/43	Cured
2	34	M	Left	4 mo	Store manager	3/1/43	Cured
3	35	F	Right	7 mo	Nurse	2/13/45	Cured
4	41	F	Left	5 mo	Housewife	4/5/44	Cured
5	28	M	Right	1 mo	Shipping clerk	1/22/43	Cured
6	60	F	Right	3 mo	Clerk	10/29/43	Cured
7	43	F	Left	8 mo	Housewife	5/5/44	Cured
8	43	F	Left	8 mo	Housewife	7/6/44	Cured
9	52	F	Right	2 mo	Clerk	3/22/45	Cured
10	30	F	Left	5 mo	Waitress	3/5/43	Cured
11	45	M	Right	6 mo	Clerk	11/2/44	Cured
12	35	F	Left	3 days	Housewife	7/6/45	Cured
13	44	F	Left	7 mo	Teacher	2/13/45	Cured
14	54	F	Left	4 mo	Clerk	7/9/45	Cured
15	68	F	Right	1 yr	Housewife	4/11/47	Cured
16	68	F	Left	6 mo	Housewife	1/10/47	Cured
17	29	F	Left	5 mo	Housewife	8/16/47	Cured
18	58	F	Right	1 mo	Housewife	3/15/48	Cured
19	56	F	Right	2 mo	Housewife	12/31/47	Cured
20	52	F	Right	1 mo	Awning cutter	3/6/48	Cured
21	27	F	Left	8 mo	Housewife	3/2/48	Cured
22	45	F	Left	6 mo	Housewife	4/15/47	Cured

don, resulting in an aseptic inflammation of mild chronic degree. Fibrous changes supervene, resulting in stenosing tenovaginitis. Sections of the tendon sheaths show hypertrophy of the synovial layers, with thickening and increased vascularity in the layers of loose connective tissue, and the ligaments become thickened and fibrotic. Study of the tendon and the peritendinous tissues shows hyalinization, mucoid changes (with distortion of the collagen bundles) and, in some cases, a suggestion of early calcification (Meadoff and Gray).

Treatment.—Conservative measures may be used in the early stages, the primary indications being protection of the wrist and hand if the causative factor is occupational stress. These measures consist of periodic finger and thumb relaxing exercises and immobilization of the first metacarpal bone in extension by means of a padded splint or, in painful conditions, a well fitting plaster cast. Subsequently, treatment by local roentgen therapy may be helpful. Usually, if symptoms persist, surgical treatment is advised. In most of the cases in this series, however, the condition was in a chronic stage, and surgical intervention was advised at once.

The procedure is simple and is done with novocaine anesthesia. The cutaneous area over the thickened nodule is infiltrated, care being taken in making the small incision to avoid injury to the small sensory branch of the radial nerve. The incision should be transverse over the radial styloid, as the longitudinal incision may result in a painful or keloid scar. The tendon sheath is split longitudinally, and a small probe is passed above and below the constricted area. The patient then actively moves the two tendons through the full range of motion to be certain that release of the constriction is adequate.

Bunnell, in his excellent book *Surgery of the Hand* and in his personal discussion of this condition, stated that he has searched for and found aberrant tendons in about 20 per cent of his patients. These tendons are usually attached to the carpus, and he advises their excision. After the operation, motion is encouraged as soon as possible, and in most cases, as soon as the skin has healed and the stitches have been removed, the patient is urged to use the thumb and wrist normally. Most observers report the procedure as simple, safe and effective, with complete functional restoration possible in about two weeks. As



A, sketch showing limited extension and flexion of thumb and limited ulnar deviation of hand and thumb, with tender area at wrist. *B*, exposure of affected area with cutaneous incision retracted.

for nonsurgical relief, it has been noted by Patterson and Jones that conservative measures may require from four months to two years with a greater recurrence rate than that encountered in patients surgically treated, with the added disadvantage of functional loss due to prolonged splinting. In this series the results of operation were complete relief of local symptoms and rapid and complete return to functional use.

SUMMARY AND CONCLUSIONS

In this series of 22 cases there were 18 female and 4 male patients. The left wrist was involved in 13 cases and the right in 9. The age range was from 27 to 68 years. All patients were checked at regular intervals for six months, and there were no complications and no recurrences. Complete relief was obtained in two to six weeks. It is interesting to note that only 1 of the patients was left-handed and the left wrist was the one involved. In 2 cases an aberrant tendon was found, and in 1 it was excised.

RESUMEN

En esta serie que comprendía 22 casos había 18 mujeres y 4 hombres cuya edad variaba de 27 a 68 años. En 13 casos estaba complicada la muñeca izquierda, y la derecha en 9 pacientes. Todos los pacientes fueron examinados durante seis meses a intervalos regulares, no observándose complicaciones ni recaídas. En dos a seis semanas se obtuvo un alivio completo. Es de interés señalar que solamente uno de los pacientes era zurdo y que la muñeca afectada era la izquierda. En dos casos se observó un tendón anormal que fué operado y en un paciente.

RÉSUMÉ

Dans cette série figurent 22 cas, 18 femelles et 4 mâles.

Dans 13 cas, le poignet gauche était atteint et dans 9 autres cas, le poignet droit. L'âge des malades variait de 27 á 68 ans. Tous les malades furent examinés à intervalles réguliers pour six mois; il n'y eut aucune complication, aucune réudive. Le soulagement complet fut obtenu dans deux à six semaines. Un seul des malades était gaucher et le poignet gauche fut attaqué. Dans deux cas, un tendon aberrant fut trouvé et un fut excisé.

RIASSUNTO

Nella serie dei casi riportati dall'A., 18 erano femmine, 4 maschi. Il polso sinistro era coinvolto in 13 casi: il destro in 9. L'ota' ha variato da 27 a 68 anni. Tutti i pazienti sono stati controllati ad intervalli regolari per 6 mesi: nessuna complicazione, nessuna recidiva. Una completa guarigione e' stata ottenuta in 2-6 settimane. E' interessante notare come in un solo caso si trattava di un mancino: in questo caso il polso offeso e' stato il sinistro. In due casi e' stato riscontrato un tendine aberrante: in uno, questo e' stato esciso.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

In dieser Serie von 22 Faellen befanden sich 18 weibliche und 4 maennliche Kranke. Das linke Handgelenk war in 13 Faellen und das rechte in 9 Faellen befallen. Dit Altersgrenze schwankte zwischen 27 und 68 Jahren. Alle Kranken wurden in regelmaessigen Zeitabstaenden von 6 Monaten nachuntersucht, und es ergaben sich keine Komplikationen oder Rueckfaelle. Voellige Wiederherstellung wurde in 2 bis 6 Wochen erzielt. Interessant ist die Feststellung, dass nur ein einziger inker Linkshaender war und dass in e ein Fall das linke Handgelenk betroffen ar In 2 Faellen wurde eine abweichende ehne gefunden, die in einem Falle exzidiert urde

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Echoes of the Past

I. Oliver Goldsmith, Unsuccessful Physician

During a recent journey to England I visited the famous Cheshire Cheese in Fleet Street, London, a tavern renowned as the meeting place of Dr Samuel Johnson and his colleagues The singular pleasure was afforded me of sitting in the favorite place of Oliver Goldsmith (1728 1774) The natural result of this experience was a reawakening of interest in the life of Goldsmith

In the world of English literature Oliver Goldsmith was the Ugly Duckling It cannot be denied that he was not a handsome man He was nevertheless universally beloved His friends were many—one of his closest being Samuel Johnson His interests shifted and changed like a woman's emotions Yet he stands as a great man of letters even today—as poet as dramatist, as novelist and as master of the essay Some of his works including *Citizen of the World The Vicar of Wakefield She Stoops to Conquer* and *The Deserted Village*, are counted as masterpieces of English literature

One aspect of his life lies forgotten in the pages of unwritten history Little has been recorded of Oliver Goldsmith as a physician Yet when he was twenty four after taking a B A degree at Trinity College he matriculated at Edinburgh University to study medicine He spent two years there after which he went to Leyden to continue his studies for another year (1752) He was not a very attentive medical student After Leyden he became a traveler throughout Europe earning his way mostly by singing and playing the flute

In 1756 he returned to London, where he became an assistant druggist While serving in this capacity he met an old friend, Dr Sleigh who assisted and encouraged him to enter the practice of medicine His practice was very poor and he passed the time in writing In 1765 he changed his location and attempted to practice medicine on a grander scale than before His intentions were good but his efforts failed He became discouraged After a few months of bitter disappointment he separated himself from medicine forever

The unsuccessful physician now commenced to write in earnest As a writer he associated with the Cheshire Group Here with Dr Samuel Johnson he provided never failing stimulation to the struggling poets and writers of his day

Perhaps if he had been a successful physician the world would never have heard of Oliver Goldsmith Posterity has long forgotten many successful men of medicine, but the poets and writers of former ages live in honor Such men as Oliver Goldsmith will long endure in man's memory They will die only when the written word fades into oblivion

—*Bernard J Ficarra M D, F I C S*

Changing Concepts Concerning Diverticulitis

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THE Clinical Society of London met on Dec. 14, 1906. Mr. Barkley Moynihan of Leeds reported to this organization the cases of 6 persons upon whom he had operated recently, in which, although the diagnosis of malignant disease of the colon had been made at the time of operation or before, subsequent examination of the specimens or the after-history of the cases showed that the diagnosis had been incorrect. Two of the tumors were thought by Mr. Moynihan to be due to perforation of a false diverticulum; two others, from their descriptions, would today be accounted for in the same way.

The surgeon remarked that mimicry of malignant disease in the right side of the colon by a hyperplastic process was well known but that it was not so generally known that inflammatory tumors presenting all the clinical appearances of cancer existed in all parts of the large intestine. Most of these, in his opinion, were due to false diverticula. There was no evidence that they were syphilitic. Moynihan also reported that he had examined several specimens of such diverticula in museums, wrongly described as malignant.

The discussion by those present at this meeting, coupled with later and similar reports from the Mayo Clinic, demonstrated that surgical intervention in the treatment of diverticulitis actually originated in a series of erroneous diagnoses arising from the resemblance of this lesion to cancer. Although diverticulosis and its complications had been described in medical literature for more than fifty years, most of the material came from the autopsy table, and diverticulitis was regarded as a rare medical curiosity.

The following year, William J. Mayo and his associates stated that 5 patients with diverticulitis had been operated upon at the Mayo Clinic up to that time. By 1911 the total had grown to 15; these were reviewed by the great pathologist Louis B. Wilson, who seriously considered the possibility that a direct etiologic relationship existed between diverticulitis and cancer. The differential diagnosis of the two lesions had apparently been insurmountable. Four of the 15 patients had carcinoma associated with diverticulitis and were clinically regarded as cancer patients, as were 5 others in whom an inflammatory lesion only was present. In 3 others the diagnosis was tumor of other organs, and in only 1 was the preoperative diagnosis correct. According to Wilson, in none of the 4 patients with malignant lesions was the malignant process early enough to prove its origin in epithelial proliferation in a diverticulum, but he believed from the evidence then available that there was little doubt that this had occurred, probably in epithelium segregated by chronic inflammation.

Since the publication of these surgical reports the literature concerning diverticulitis, its symptoms, its complications and their management, has been voluminous. The opinions expressed concerning the disease have been consistently emphatic. Strangely enough, however, these emphatic and strongly worded opinions have altered from decade to decade to such an extent that my own present concern, for example, should perhaps be rather to correct statements made in the past than to offer new wisdom. The increased number of proved cases available for study, improved diagnostic facilities, more frequent joint medical and surgical management of individual cases and the recent tremendous changes in the scope and effectiveness of surgery of the colon in general have no doubt been responsible for these constantly changing concepts of a comparatively new surgical lesion.

For many years the congenital or acquired nature of diverticula of the colon was debated. Sufficient evidence has been assembled to indicate that, unlike such typically congenital lesions as Meckel's diverticulum, diverticulosis is a condition acquired—as a rule—during

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adult life The two sexes are equally susceptible, but the male for some reason is the more prone to complications requiring surgical intervention

The mechanism of the sac formation has also been variously explained Recent investigations by Carlson and Hoelzel suggest that accumulation of fat in the appendices epiploicae of the colon and abnormally high intracolonic pressure are etiologic agents in the development of these pockets The experiments of these investigators on rats show that diverticula are found in areas contiguous to lobulated fat deposits and may be due to herniation of the fat infiltrated and weakened part of the wall of the colon into a fat-infiltrated peritoneal sacculation They were able to bring about increased intracolonic pressure and produce diverticula by feeding animals a concentrated low residue diet that caused continuous contraction—which was not present when bulky diets were fed

Although the question of mechanism is still moot, sufficient statistical data have been assembled to warrant these conclusions Diverticulosis of the colon is a condition present in 5 per cent of persons over 45 years of age Changes due to infection occur in 15 per cent of persons with diverticulosis, and these changes are more likely to occur in male than in female patients One in 4 persons with diverticulitis will require surgical treatment Illustrating this, in a series of 600 cases of diverticulitis observed at the Mayo Clinic, Pemberton reported that in 144 cases, or 24 per cent, surgical treatment was employed

Diverticula are present in the sigmoid colon in 75 per cent of cases, and the complications requiring operation rarely occur in any other segment The factors responsible for this selective location (other than the greater prevalence of the pockets) are, apparently, the narrower lumen of the left side of the colon, the stasis which occurs because of its storage function and the firm consistency of the bolus

It is of some historical interest to trace the ebb and flow of opinion concerning the surgical management of this disease As has been mentioned, during the first era the one stage removal of tumefactions resulting from inflammation in and about diverticula resulted from mistaking these tumors for cancers of the colon When the lesion was better understood one-stage resection continued to be practiced until high mortality forced reconsideration of the maneuver In the early '30's colostomy, as a first stage procedure or as a curative measure, began to be widely adopted J H Morrissey in 1931 advocated colostomy preliminary to operation for colovesicular fistula as a substitute for primary operation on the fistula In the discussion of his paper Fred Rankin expressed agreement and reported three institutions in which stage procedures had been used successfully by him for this complication Many surgeons began to recommend the construction of a colostomy stoma to be left in place for approximately one year and then closed if the roentgen picture was satisfactory By the beginning of the present decade, our own observation had convinced us that this procedure was unsatisfactory and we decided that a person with diverticulitis who actually required surgical intervention was a candidate for resection of the lesion, preferably in two stages General experience has proved the truth of this contention Pemberton has reported that of 30 cases observed prior to 1941, in which colostomy was constructed and later closed, further serious complications occurred in two thirds, and that it was impossible to determine which patients were proper subjects for closure without resection

An additional argument for resection of inflammatory tumefactions is that the presence of a coincidental neoplasm cannot always be eliminated Rowe and Kollmar surveyed all the recorded carcinomas of the large bowel in Dallas hospitals for an average period of nine years They found that in 312 cases of diverticulitis and 700 instances of cancer of the colon there were 7 in which the two lesions coexisted A search of our own files for the past six years reveals that double lesions have occurred in 11 instances, carcinoma being present in 9 of the cases A report from the Mayo Clinic recently indicated that in roughly 25 per cent of 144 cases in which operation was performed at that institution carcinomas could not be excluded with certainty by clinical methods of examination, and in many cases and even at operation, the surgeon was unable to make the distinction We are apparently now entering a new era of surgical management. In a desire to reduce morbidity and because of the present possibility of erecting over the patient a protective umbrella of sulfa and antibiotic medication, there is a definite trend toward the earlier plan of one-stage resection and anastomosis.

The best example of the many changes in medical opinion concerning the symptoms of this lesion is found in explanations of the intestinal bleeding. During the era that immediately followed Louis Wilson's report indicating that malignant transformation might occur, bleeding was regarded as an evidence of this change. When it became clear that this relationship is coincidental only, the trend quickly eventuated in a general medical view that bleeding could not arise from diverticula.

Among others who voiced this opinion a decade ago, Brown and Marcley in 1937 stated that when bleeding occurs in a patient with diverticulitis a careful scrutiny of the history, together with proctoscopic observation, would reveal that the bleeding was *anorectal* in origin. However, they agreed that they may have been overcritical in their interpretation of the cause of bleeding as both Ochsner and Bockus and Bargen and Willard had stated that bleeding occurred in 7 per cent of their cases of diverticulitis. During the same period Rankin and Graham stated in their text: "Blood in the stool is of little significance in diverticulitis and although it is present in a number of cases, usually *proctoscopic* examination will reveal that the presence of the diverticulitis has little, if anything, to do with the presence of the blood." Hayden, in his book, was equally emphatic, stating that "bleeding should not be considered a symptom of either acute or chronic diverticulitis. Although it was present in twenty-eight of our 140 cases (at the Massachusetts General Hospital), there is no proof that the blood came from the involved area."

Because I was convinced that diverticulitis could be a source of bleeding and because the type of bleeding seen was not compatible with low-lying anal or rectal lesions, our own observations were correlated and reported. Bleeding has been a frequent concomitant or presenting symptom in persons with diverticulitis coming under our observation. In 1939, 24 consecutive case records obtained from the files of Baylor Hospital were first reviewed. The patients had been seen by various members of the medical or the surgical staff. Bleeding had occurred in 6 cases; in 2 of these there was an apparent possibility that other lesions were responsible, leaving an incidence of 16 per cent. Although not all of the patients were examined proctoscopically, the presence of diverticula and the absence of higher causes of intestinal bleeding were established by careful roentgenograms. In 16 other persons referred for diverticulitis, we complied with every diagnostic indication to eliminate any other cause for bleeding from the bowel when it occurred. Each of these patients has been examined sigmoidoscopically several times; all have been checked by roentgen examination and have had the benefit of medical consultation. Eight of the 16 patients had had hemorrhages which were not explained by any other lesion. In 4 of the patients the blood was slight in amount and either mixed with the stool or with mucus. In 4 others it was spontaneous, massive and dark. The incidence in the 40 cases analyzed was 30 per cent.

Bleeding has been observed so consistently in persons with diverticulosis that during the early '40's the demonstration of diverticula by barium enema was considered sufficient evidence in the presence of otherwise unexplained passage of blood. In support of this contention, Smithwick in 1942 called attention to the fact that the incidence of carcinoma in Rankin and Brown's series of 309 cases of diverticulitis was 2.9 per cent, while the incidence of bleeding was 16.5 per cent. In the discussion of Smithwick's paper before the American Surgical Society, Henry Cave was equally emphatic. "It is the experience of most of us," he said, "that patients with a history of (unexplained) rectal bleeding sent for a barium enema return with a report of diverticulosis or diverticulitis."

Most of us are still convinced that these lesions can be solely responsible for intestinal hemorrhage—particularly lesions of the massive spontaneous type. The formation of areas of granulation tissue in the pockets or, as Lahey suggests, erosion of the nutrient artery in an appendix epiploica may be the mechanism. On the other hand, concomitant lesions, difficult to detect, may be responsible.

Scarborough of San Francisco called attention last year to the fact that presence of blood in the stool is now too frequently attributed to diverticulitis of the colon. He expressed the opinion that bleeding can occur in cases of diverticulitis, but added that in his experience such hemorrhage had often been due to a coexisting adenomatous neoplasm. Scarborough and Klein reported the removal during a two-year period of polypoid tumors of the colon from 16 patients in whose cases a previous diagnosis of diverticulitis had been made as the explanation for rectal bleeding. After operation there was no further bleeding in any of these patients, although the diverticular disease was still present. In 12 cases a single adenomatous polyp was removed by colotomy or through a proctoscope. All were benign except 1, which revealed a small area of malignant degeneration in an otherwise benign adenoma. In the remaining 4 cases obvious malignant degeneration was observed at laparotomy, necessitating resection.

In Scarborough's opinion, differential diagnosis is largely dependent upon roentgen examination of the colon. The presence of diverticula, and particularly the presence of distortions resulting from diverticulitis, greatly increase the difficulty of demonstration of polypoid lesions This is sometimes impossible even with repeated examinations and use of the air contrast technic. The continual passage of blood-stained mucous, which is highly characteristic of polypoid disease or small cancers of the colon, justifies exploration if repeated roentgen examinations give negative results.

As a final comment, it may be emphasized that the aid of a skilled internist is invaluable in the control of this disease, but a more positive participation on the part of the surgeon is indicated if too frequent fatality in its acute stage and too prolonged morbidity from its chronic complications are to be avoided. Unquestionably the internist has been expected to shoulder too much responsibility alone and for too long, the surgeon as a rule entering the picture much as a fireman is called in when the conflagration is already out of control. The question of proper surgical management is not a closed book, as may be seen in the light of our past indecision, but from available evidence we may conclude that more intensive proctoscopic and roentgenologic investigations, and even exploratory laparotomy, are indicated when the first observations are inconclusive and that more frequent extirpation of chronic lesions is desirable when the possibility of coincident neoplasm exists or the problem of irreversible change is present

SUMMARY

The author reviews the history of surgical knowledge of diverticula pointing out successively the many changes of concept that have accompanied progress in this field The literature on the subject once scanty has become voluminous Although the question of mechanism is still undecided, it is now believed that diverticulosis of the colon is present in 5 per cent of persons over 45 years of age

The relation of diverticula and intestinal hemorrhage is emphasized

RÉSUMÉ

L'auteur passe en revue l'histoire des connaissances chirurgicales des diverticules, indiquant successivement les nombreuses transformations subies par les théories qui ont accompagné les progrès dans ce domaine Les articles écrits à ce sujet, jusqu'alors très peu nombreux, sont devenus abondants Bien que le probléme "mécanique" en soit encore vague, l'opinion générale admet que la diverticulose du gros intestin est présente dans 5% des individus au dessus de 45 ans

Le rapport des diverticules avec l'hémorrhagie intestinale est souligné dans cet article

RIASSUNTO

Passa in rassegna la storia dei diverticoli del colon. Dapprima scarsa, la letteratura sull'argomento e' di'venuta molto voluminosa. il progresso e' stato continuo, anche se contrastato da opinioni varie Sembra che la diverticolosi del colon sia presente—oltre i 45 anni—nel 5% dei soggetti Il meccanismo d'origine e' ancora oscuro Richiama l'attenzione sui rapporti fra diverticoli ed emorragie intestinali.

RESUMEN

El autor pasa revista a la historia del-

conocimiento quirúrgico de los divertículos, señalando sucesivamente las notables variaciones de concepto que han acompañado a los adelantos realizados en este campo. La literatura sobre este tema que antaño fué escasa, es hoy abundante. Aunque el problema del mecanismo todavía no se ha decidido, se cree en la actualidad que existe diverticulosis del colon en el 5 por ciento de las personas mayores de 45 años de edad.

Se destaca la relación entre los divertículos y la hemorragia intestinal.

ZUSAMMENFASSUNG

Der Verfasser gibt einen Ueberblick ueber die Geschichte der chirurgischen Erkenntnisse auf dem Gebiete der Divertikel und hebt der Reihe nach die vielen Wechsel in der Auffassung hervor, die mit dem Fortschritt auf diesem Gebiet einhergegangen sind. Die einst spaerliche Literatur ueber das Thema ist umfangreich geworden. Obgleich die Frage des Mechanismus noch unentschieden ist, so wird doch jetzt angenommen, dass Divertikulose des Dickdarms in 5% aller Personen im Alter von ueber 45 Jahren besteht.

Die Beziehung zwischen Divertikeln und Darmblutung wird betont.

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It is when we try to grapple with another man's intimate need that we perceive how incomprehensible, wavering, and misty are the beings that share with us the sight of the stars and the warmth of the sun. —*Joseph Conrad*

Those who are unscrupulous in their pleasures only pretend to be scrupulous in serious things. It is a sign of a savage disposition when his pleasures do not make a man kindly. —*Vauvenargues*

Lesions of the Small Intestine

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IN the analysis of lesions of the small bowel commonly diagnosed by roentgenologic studies, there are limitations and pitfalls because of the multiplicity of overlying loops of small intestine, a constantly changing pattern and innumerable normal variants This makes examination of the small intestine difficult, tedious and time consuming, but in recent years the roentgenologist's growing interest in this study has led to an augmented statistical incidence of lesions of the small bowel

In the study of the small intestinal tract, methods are many and technics are variable A preliminary film of the abdomen should precede all gastrointestinal examinations It is our suggestion that 4 ounces of physiologic solution of sodium chloride containing 4 ounces of barium sulfate, as advocated by Golden, be given the fasting patient by mouth, and films taken every thirty minutes until the bulk of the opaque medium has passed through the terminal portion of the ileum into the colon Frequent fluoroscopic examinations and spot films are necessarily made at varying intervals during the examination The small intestinal enema, as described by Schatski, has certain distinct advantages but requires the passage of a duodenal tube, and from a practical aspect this is a definite disadvantage

A painstaking study of the small bowel is indicated in cases of intestinal bleeding, cases of persistent diarrhea of unknown cause, cases in which there is a palpable abdominal mass of questionable origin, and cases of persistent intermittent abdominal pain in which repeated abdominal films show no evidence of a definite obstruction

1. *Developmental Anomalies*—Duodenal Obstruction Incomplete rotation of the intestine is not uncommonly observed in persons with no associated symptoms On the other hand, a condition with which the surgeon is occasionally confronted is duodenal obstruction secondary to malrotation [illegible] intestine Bands of peritoneum [illegible] unrotated cecum to the right [illegible] abdominal wall may produce ob[illegible] descending portion of the du[illegible] pressure Persistent [illegible] distention of the upper [illegible] from birth may suggest th[illegible] in the plain film of the abd[illegible] distended, gas filled stom[illegible] proximal to the defect [illegible] obstruction is usually not complete [illegible] some gas in the small intestine [illegible] revealing a malrotated cecum will [illegible] in diagnosis and studies after a thin barium meal usually confirm the presence and site of the anomaly Surgical intervention is necessary to relieve the obstruction (Fig 1 A and B)

Duodenal obstruction may also be the result of congenital atresia The usual roentgen picture is that of a distended stomach and duodenum and the absence of gas in the small bowel If, however the stomach has been emptied by repeated vomiting barium by mouth may be given with care to demonstrate the site of obstruction Since infants in this condition rarely live more than a few days without surgical relief early diagnosis and immediate operation are imperative (Fig 1 C and D)

Symptoms and roentgen observations in cases of duodenal stenosis vary according to the degree of obstruction In infants who present severe symptoms from birth differentiation from atresia of the bowel is usually impossible and unnecessary since immediate operation is indicated for either entity In other instances in which the obstruction is incomplete symptoms are milder and several years may elapse before the correct diagnosis is made Therefore in children who present symptoms of occasional intermittent vomiting associated with abdominal pain and failure to gain weight roentgenologic investigation of the small bowel is advised (Fig 2)

Hernia Herniation of the small bowel through the diaphragm may *frequently* pro

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Submitted for publication November 25 194[illegible]

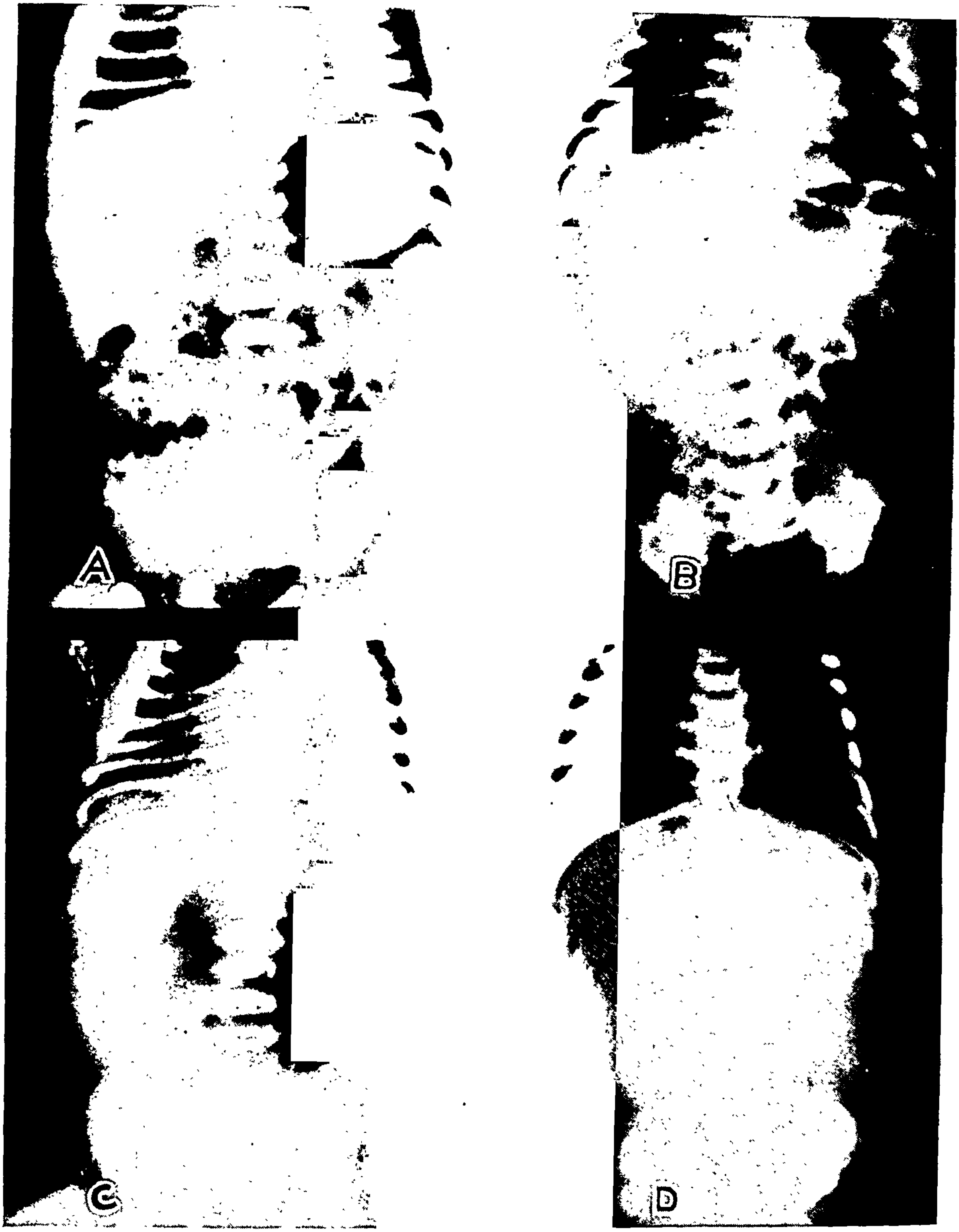


Fig. 1.—*A*, distended stomach of infant 3 days old, with duodenal obstruction due to malrotation of intestine. *B*, roentgenogram taken ten days after surgical relief of obstruction. *C*, gas-filled stomach and duodenum proximal to duodenal atresia. *D*, complete retention of opaque medium in stomach and duodenal bulb three hours after barium meal.

duce a bizarre and confusing picture in the thoracic roentgenogram Unusual or suspicious shadows in either lung field should first be investigated by gastrointestinal roentgen examination If herniation is present the observations are usually self evident

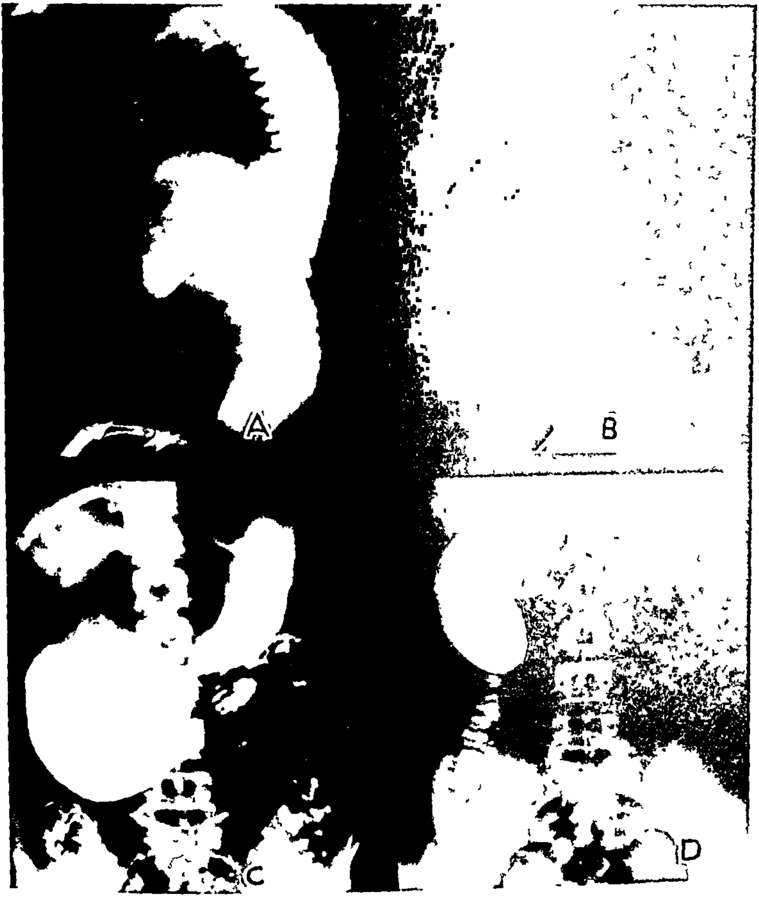


Fig 2 — *A*, obstruction of second portion of duodenum due to stenosis *B*, film taken one hour later showing barium beyond site of incomplete obstruction *C*, roentgenogram of [illegible] year old mother of child in *A* and *B* with history of gastroenterostomy at 8 years of age for repeated vomiting since birth Note marked dilatation of first portion of duodenum *D*, retention of barium in dilated duodenum *after twenty four hour interval*

Congenital defects of the peritoneum and mesentery may allow most of the small bowel to herniate into a mesenteric pouch, producing a so-called internal hernia. Ladd and Gross describe seven sites through which the bowel may enter. This condition may be observed incidentally at autopsy in patients who have had no apparent symptoms; rarely, however, is it the cause of intestinal obstruction. The diagnosis should be suspected when the barium-filled small bowel is seen to lie in a circular pattern limited to one portion of the abdomen and does not change appreciably with alteration in the position of the patient. It may also be anticipated by the abnormal course of the Miller-Abbott tube as it proceeds within the small bowel (Fig. 3).

Diverticula: Diverticula of the intestine may be either congenital or acquired. Owing to their broad necks they usually fill and empty readily and are in most instances clinically insignificant. They occur most commonly in the duodenum, occasionally in the jejunum and rarely in the ileum. Occasionally diverticula may produce symptoms due to pressure or retention, and rarely they may undergo ulceration. Surgical extirpation of the diverticulum usually affords relief to these patients. On the other hand, one occasionally encounters multiple diverticula in the upper intestinal tract of a patient with no associated symptoms.

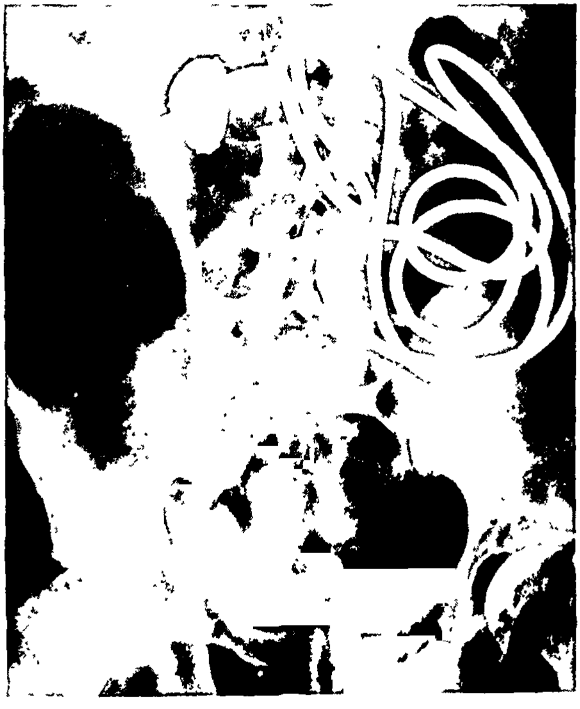


Fig. 3.—Unusual circular course of Miller-Abbott tube due to paraduodenal hernia.

2. *Inflammatory Lesions.* — Postbulbar Ulcer: Ulceration of the duodenum beyond the bulb must be differentiated from a single diverticulum. Bleeding is the predominant symptom in the upper part of the intestine, although there may be other symptoms of duodenal cap ulceration. The ulcer may be embedded within or perforate into the pancreas, producing secondary pancreatitis. A persistent niche defect with spasm and irritability in the involved portion of the duodenum, perhaps with some narrowing and irregularity of the lumen and localized tenderness, justifies the diagnosis of postbulbar ulcer (Fig. 4*A*).

Jejunal Ulcer: Ulceration of the jejunum subsequent to gastroenterostomy is frequently difficult to demonstrate. Fingerpoint tenderness over the stoma leads one to suspect ulceration, and demonstration of an ulcer niche confirms the diagnosis. Progress of treatment can be followed by subsequent examinations (Fig. 4, *B, C* and *D*).

Regional Enteritis: A benign nonspecific granulomatous disease, labeled regional ileitis by Crohn, Ginzburg and Oppenheimer in 1932, has since acquired many names. Cicatrizing enteritis or regional enteritis would seem to be a better term, since the jejunum may be involved as well. The lesions are characterized by ulceration, necrosis, scarring and occasional perforation. The symptoms may vary from mild vague abdominal distress to severe colicky pain and marked diarrhea. In early stages they may simulate the symptoms of acute abdominal disease calling for surgical intervention, and occasionally a mistaken diagnosis of acute appendicitis is made. Complete obstruction is rare but may occur.

The disease process is usually limited to the terminal portion of the ileum, but it may involve the jejunum or extend into the cecum. The lesions may be multiple with intervening "skip areas" of normal bowel. Roentgenologically it is frequently difficult to differentiate this entity from other inflammatory lesions; however, there are certain features that should

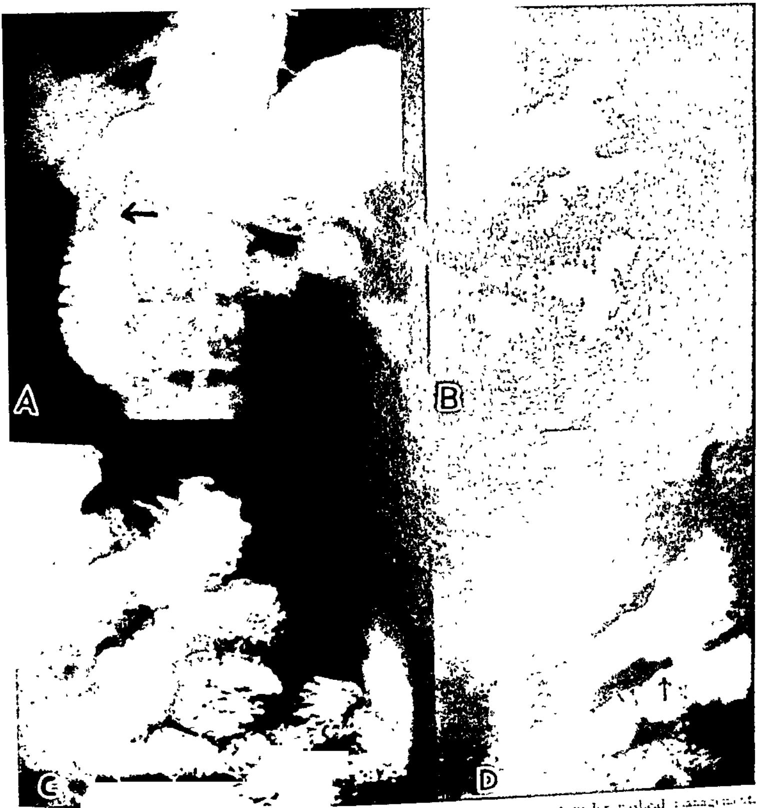
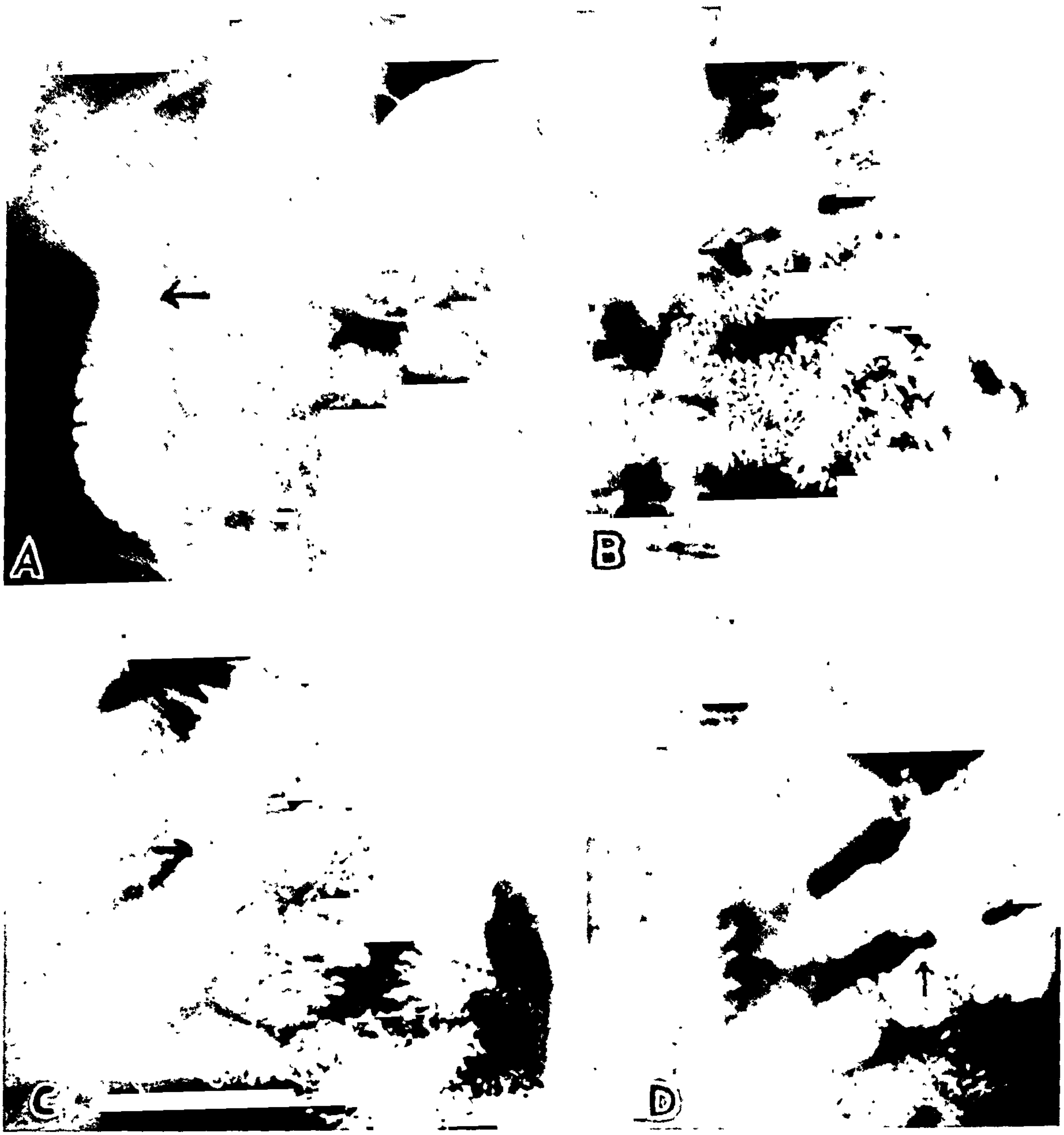


Fig. 4.—*A*, postbulbar ulcer. *B*, *C*, and *D*, marginal ulcer showing improvement under medical management.

be emphasized in differential diagnosis. The predominant roentgen observation is a constantly narrowed, irregular, fixed tubular segment of bowel, usually in the terminal part of the ileum, variable in length, with a distorted mucosal pattern. There may be some delay in the transit of the motor meal through the diseased segment of bowel; however, dilatation of the proximal intestine does not usually occur until stenosis is marked. There may be some associated spasm of the cecum (Fig. 5).

Intestinal Tuberculosis: Tuberculous enteritis occurs as an ulcerating or hyperplastic form, the latter being relatively rare. Since intestinal tuberculosis is almost invariably a complication of pulmonary tuberculosis, usually in patients with cavitative pulmonary disease, the incidence is much higher in sanitoriums than in the [illegible] population. In contrast to region [illegible]



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Congenital defects of the peritoneum and mesentery may allow most of the small bowel to herniate into a mesenteric pouch producing a so-called internal hernia. Ladd and Gross described seven sites through which the bowel may enter. This condition may be observed incidentally at autopsy in patients who have had no apparent symptoms; rarely, however, is it the cause of intestinal obstruction. The diagnosis should be suspected when the barium filled small bowel is seen to lie in a circular pattern limited to one portion of the abdomen and does not change appreciably with alteration in the position of the patient. It may also be anticipated by the abnormal course of the Miller Abbott tube as it proceeds within the small bowel (Fig. 3).

Diverticula. Diverticula of the intestine may be either congenital or acquired. Owing to their broad necks they usually fill and empty readily and are in most instances clinically insignificant. They occur most commonly in the duodenum, occasionally in the jejunum and rarely in the ileum. Occasionally diverticula may produce symptoms due to [illegible] or retention, and rarely they may [illegible] ulceration. Surgical extirpation of the diverticulum usually affords relief to these patients. On the other hand, one occasionally encounters multiple diverticula in the upper intestinal tract of a patient with no associated symptoms.

2. *Inflammatory Lesions.* — Postbulbar Ulcer. Ulceration of the duodenum beyond the bulb must be differentiated from a single diverticulum. Bleeding is the predominant symptom in the upper part of the intestine, although there may be other symptoms of duodenal cap ulceration. The ulcer may be embedded within or perforate into the pancreas, producing secondary pancreatitis. A persistent niche defect with spasm and irritability in the involved portion of the duodenum, perhaps with some narrowing and irregularity of the lumen and localized tenderness, justifies the diagnosis of postbulbar ulcer (Fig. 4A).

Jejunal Ulcer. Ulceration of the jejunum subsequent to gastroenterostomy is frequently difficult to demonstrate. Fingerpoint tenderness over the stoma leads one to suspect ulceration, and demonstration of an ulcer niche confirms the diagnosis. Progress of treatment can be followed by subsequent examinations (Fig. 4 *B*, *C* and *D*).

Regional Enteritis. A benign nonspecific granulomatous disease labeled regional ileitis by Crohn, Ginzburg and Oppenheimer in 1932 has since acquired many names. Cicatrizing enteritis or regional enteritis would seem to be a better term, since the jejunum may be involved as well. The lesions are characterized by ulceration, necrosis, scarring and occasional perforation. The symptoms may vary from mild vague abdominal distress to severe colicky pain and marked diarrhea. In early stages they may simulate the symptoms of acute abdominal disease calling for surgical intervention, and occasionally a mistaken diagnosis of acute appendicitis is made. Complete obstruction is rare but may occur.

The disease process is usually limited to the terminal portion of the ileum, but it may involve the jejunum or extend into the cecum. The lesions may be multiple with intervening "skip areas" of normal bowel. Roentgenologically it is frequently difficult to differentiate this entity from other inflammatory lesions, however there are certain features that should

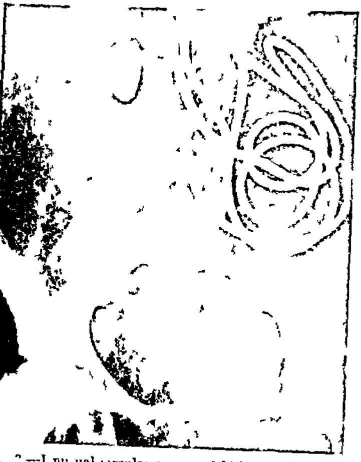

Fig. 3.—Unusual circular course of Miller Abbott tube due to paraduodenal hernia.

duce a bizarre and confusing picture in the thoracic roentgenogram. Unusual or suspicious shadows in either lung field should first be investigated by gastrointestinal roentgen examination. If herniation is present, the observations are usually self-evident.

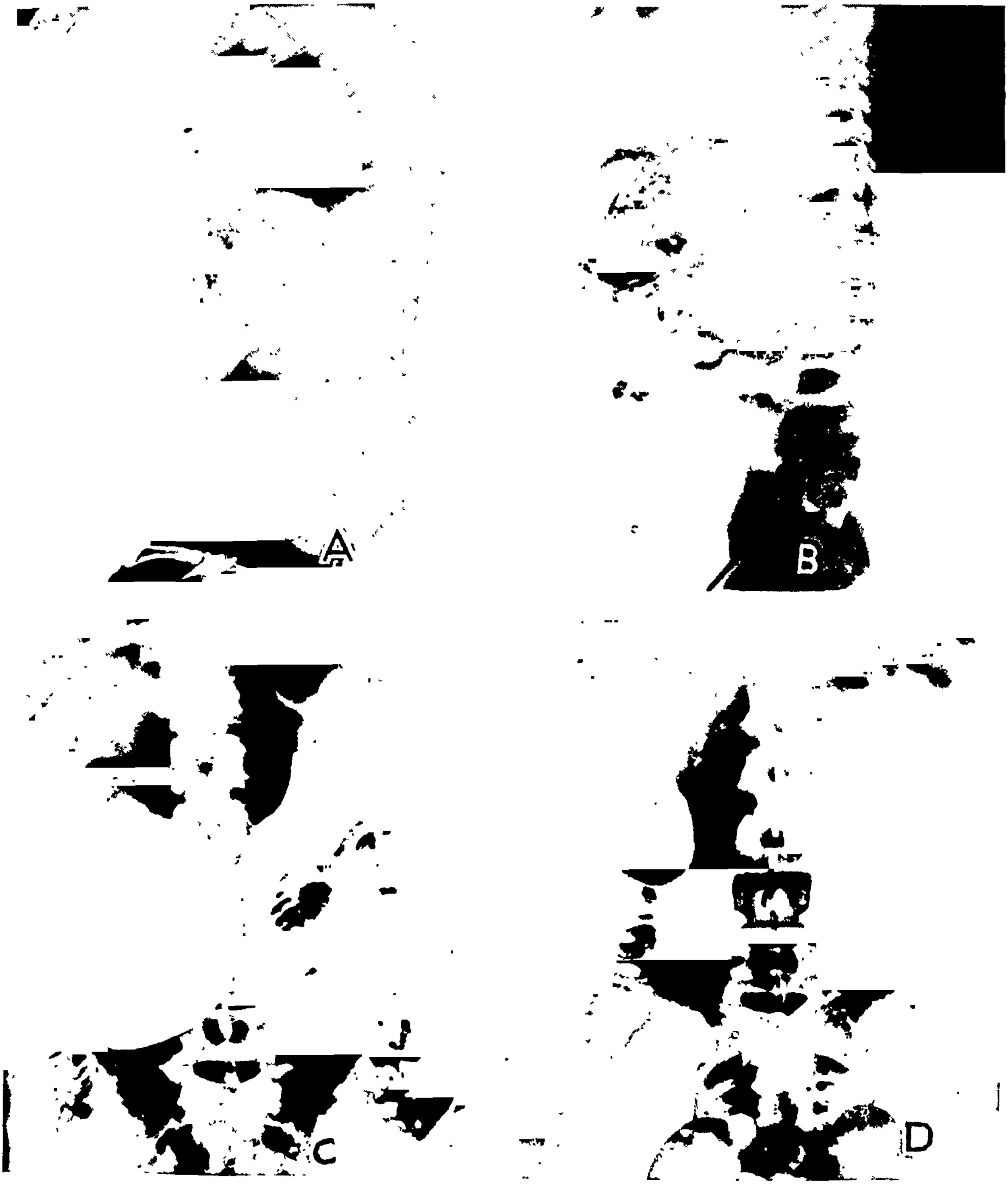

Fig. 2.—*A*, obstruction of second portion of duodenum due to stenosis. *B*, film taken one hour later, showing barium beyond site of incomplete obstruction. *C*, roentgenogram of 30-year-old mother of child in *A* and *B*, with history of gastroenterostomy at 8 years of age for repeated vomiting since birth. Note marked dilatation of first portion of duodenum. *D*, retention of barium in dilated duodenum after twenty-four hour interval.

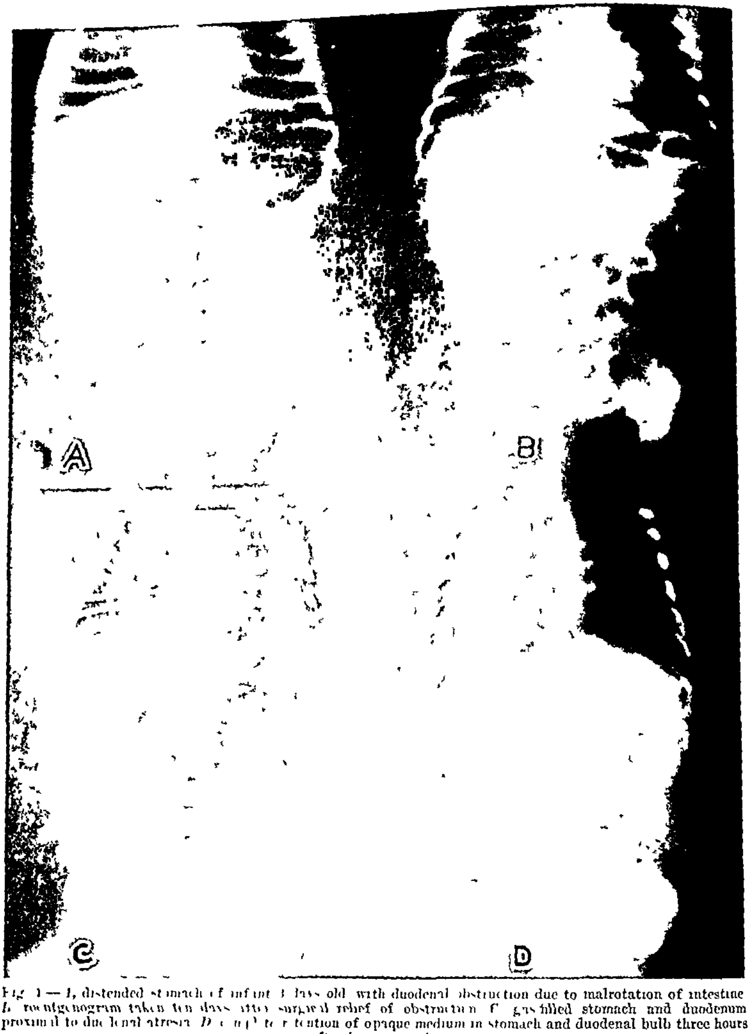

Fig. 1 — *A*, distended stomach of infant 3 days old with duodenal obstruction due to malrotation of intestine. *B*, roentgenogram taken ten days after surgical relief of obstruction. *C*, gas-filled stomach and duodenum proximal to duodenal atresia. *D*, complete retention of opaque medium in stomach and duodenal bulb three hours after barium meal.

Lesions of the Small Intestine

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IN the analysis of lesions of the small bowel commonly diagnosed by roentgenologic studies, there are limitations and pitfalls because of the multiplicity of overlying loops of small intestine, a constantly changing pattern and innumerable normal variants. This makes examination of the small intestine difficult, tedious and time-consuming; but in recent years the roentgenologist's growing interest in this study has led to an augmented statistical incidence of lesions of the small bowel.

In the study of the small intestinal tract, methods are many and technics are variable. A preliminary film of the abdomen should precede all gastrointestinal examinations. It is our suggestion that 4 ounces of physiologic solution of sodium chloride containing 4 ounces of barium sulfate, as advocated by Golden, be given the fasting patient by mouth, and films taken every thirty minutes until the bulk of the opaque medium has passed through the terminal portion of the ileum into the colon. Frequent fluoroscopic examinations and spot films are necessarily made at varying intervals during the examination. The small intestinal enema, as described by Schatski, has certain distinct advantages but requires the passage of a duodenal tube, and from a practical aspect this is a definite disadvantage.

A painstaking study of the small bowel is indicated in cases of intestinal bleeding, cases of persistent diarrhea of unknown cause, cases in which there is a palpable abdominal mass of questionable origin, and cases of persistent intermittent abdominal pain in which repeated abdominal films show no evidence of a definite obstruction.

1. *Developmental Anomalies.*—Duodenal Obstruction: Incomplete rotation of the intestine is not uncommonly observed in persons with no associated symptoms. On the other hand, a condition with which the surgeon is occasionally confronted is duodenal obstruction secondary to malrotation of the intestine. Bands of peritoneum extending from an unrotated cecum to the right upper abdominal wall may produce obstruction of the descending portion of the duodenum by extrinsic pressure. Persistent forcible vomiting and distention of the upper abdominal quadrants from birth may suggest the diagnosis, and in the plain film of the abdomen one may see a distended, gas-filled stomach and duodenum proximal to the defect. Since the obstruction is usually not complete, there may be some gas in the small intestine. A barium enema revealing a malrotated cecum will aid in diagnosis, and studies after a thin barium meal usually confirm the presence and site of the anomaly. Surgical intervention is necessary to relieve the obstruction (Fig. 1, *A* and *B*).

Duodenal obstruction may also be the result of congenital atresia. The usual roentgen picture is that of a distended stomach and duodenum and the absence of gas in the small bowel. If, however, the stomach has been emptied by repeated vomiting, barium by mouth may be given with care to demonstrate the site of obstruction. Since infants in this condition rarely live more than a few days without surgical relief, early diagnosis and immediate operation are imperative (Fig. 1, *C* and *D*).

Symptoms and roentgen observations in cases of duodenal stenosis vary according to the degree of obstruction. In infants who present severe symptoms from birth, differentiation from atresia of the bowel is usually impossible and unnecessary since immediate operation is indicated for either entity. In other instances in which the obstruction is incomplete, symptoms are milder and several years may elapse before the correct diagnosis is made. Therefore, in children who present symptoms of occasional intermittent vomiting associated with abdominal pain and failure to gain weight, roentgenologic investigation of the small bowel is advised (Fig. 2).

Hernia: Herniation of the small bowel through the diaphragm may frequently pro-

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conocimiento quirúrgico de los divertículos señalando sucesivamente las notables variaciones de concepto que han acompañado a los adelantos realizados en este campo. La literatura sobre este tema que antaño fue escasa es hoy abundante. Aunque el problema del mecanismo todavía no se ha decidido, se cree en la actualidad que existe diverticulosis del colon en el 5 por ciento de las personas mayores de 45 años de edad.

Se destaca la relación entre los divertículos y la hemorragia intestinal.

ZUSAMMENFASSUNG

Der Verfasser gibt einen Ueberblick ueber die Geschichte der chirurgischen Erkenntnisse auf dem Gebiete der Divertikel und hebt der Reihe nach die vielen Wechsel in der Auffassung hervor, die mit dem Fortschritt auf die[illegible] Gebiete [illegible] sind. Die einst spärliche [illegible] das Thema ist umfangreich [illegible] obgleich die Frage des Mechanismus [illegible] entschieden ist, so wird [illegible] Divertikulose des Dickdarms in 5% aller Personen im Alter von ueber 45 Jahren besteht.

Die Beziehung zwischen Divertikeln und Darmblutung wird betont.

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It is when we try to grapple with another man's intimate need that we perceive how incomprehensible, wavering and misty are the beings that share with us the sight of the stars and the warmth of the sun.

—*Joseph Conrad*

Those who are unscrupulous in their pleasures only pretend to be scrupulous in serious things. It is a sign of a savage disposition when his pleasures do not make a man kindly.

—*Vauvenargues*